INTEGRATED AV SURROUND AMPLIFIER

KA-V1000R

SERVICE MANUAL

KENWOOD

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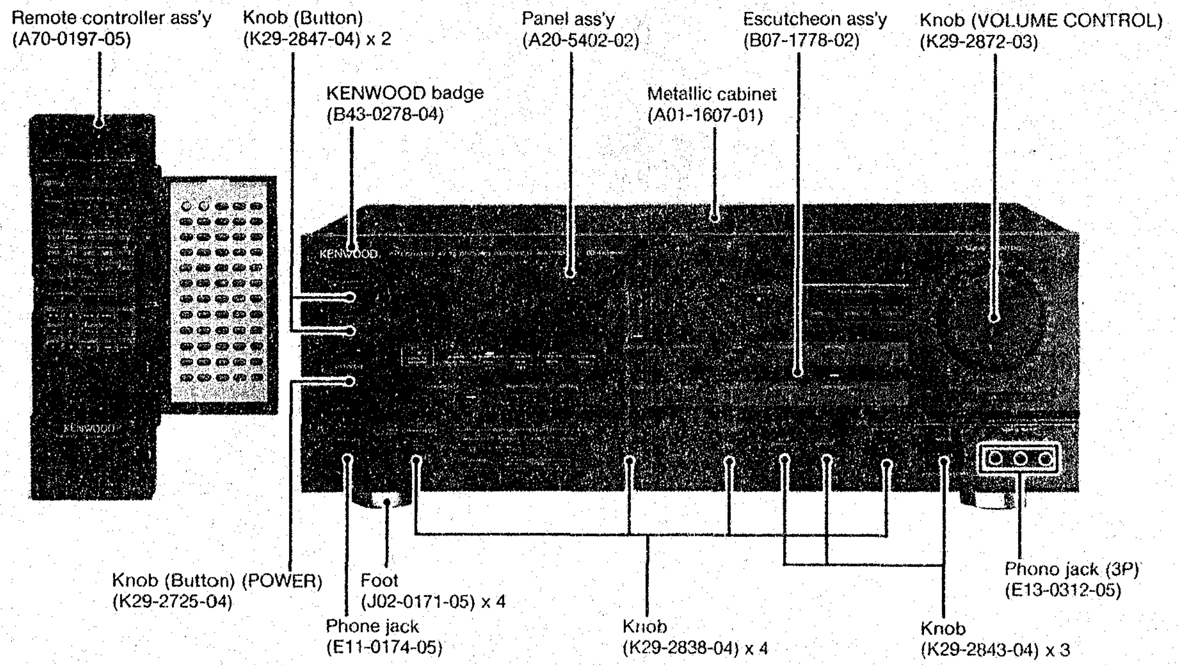
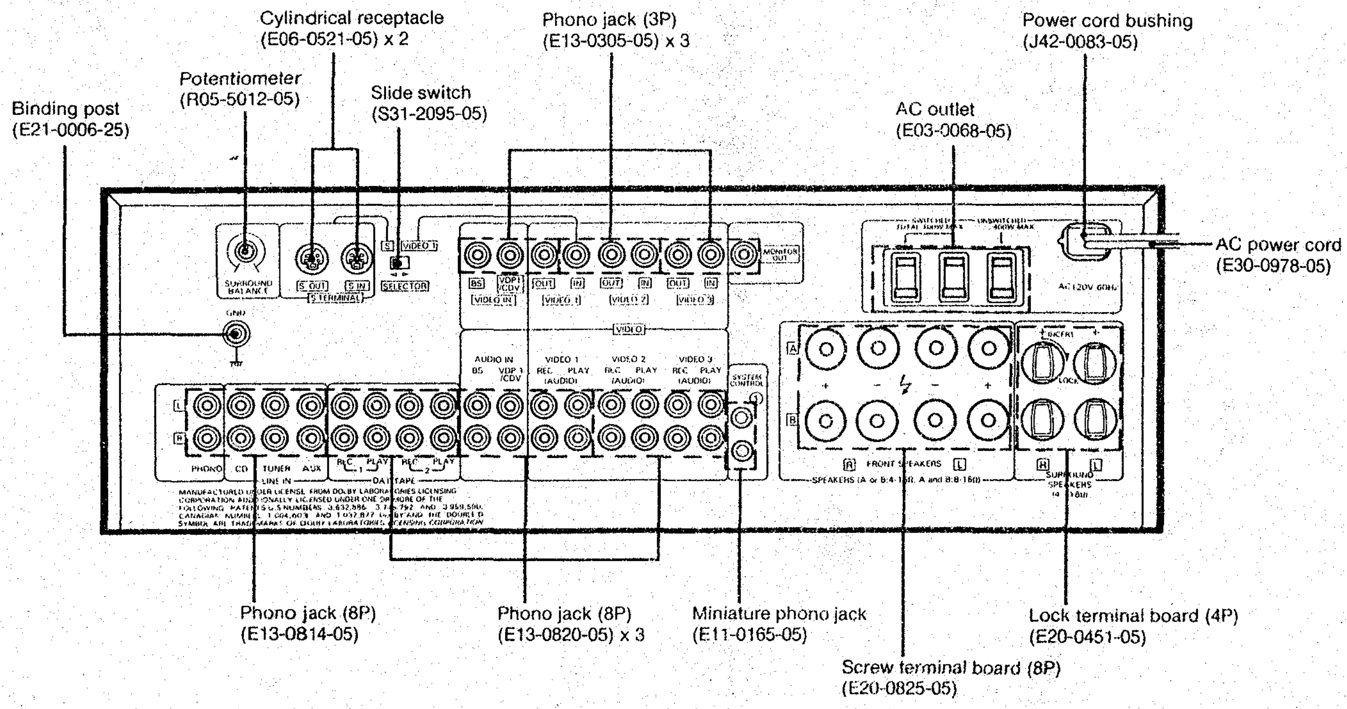
B51-3434-00(C)1329


Remote controller ass'y (A70-0197-05)
Knob (Button) (K29-2847-04) x 2
KENWOOD badge (B43-0278-04)
Panel ass'y (A20-5402-02)
Metallic cabinet (A01-1607-01)
Escutcheon ass'y (B07-1778-02)
Knob (VOLUME CONTROL) (K29-2872-03)
Knob (Button) (POWER) (K29-2725-04)
Foot (J02-0171-05) x 4
Phone jack (E11-0174-05)
Knob (K29-2838-04) x 4
Knob (K29-2843-04) x 3
Phono jack (3P) (E13-0312-05)


Cylindrical receptacle (E06-0521-05) x 2
Phono jack (3P) (E13-0305-05) x 3
Power cord bushing (J42-0083-05)
Potentiometer (R05-5012-05)
Slide switch (S31-2095-05)
Binding post (E21-0006-25)
AC outlet (E03-0068-05)
AC power cord (E30-0978-05)
Phono jack (8P) (E13-0814-05)
Phono jack (8P) (E13-0820-05) x 3
Miniature phono jack (E11-0165-05)
Lock terminal board (4P) (E20-0451-05)
Screw terminal board (8P) (E20-0825-05)

*Refer to Parts List on page 77.

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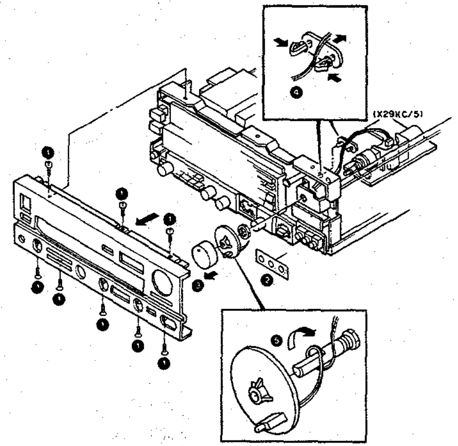
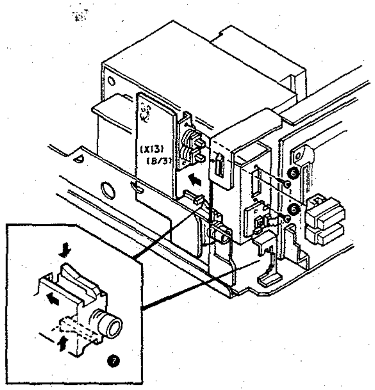
DISASSEMBLY FOR REPAIR

(The case must be removed before performing the following operations.)

1. Remove the 8 screws (upper top: 3, lower top: 5) holding the front panel to the frame (❶), and take out the front panel in the direction of the arrow.
2. Remove the blind plate (❷).
3. Pull off the VOLUME CONTROL knob, and then remove the knob holder on which the LED is installed. (❸).
4. To remove the Control Circuit Unit (X29-1930-00) (C/5), first remove the hex nut on the chassis, and then remove the clamper on the back of the frame by pushing the claws to the left and right (❹). Lastly, pull the Control Circuit Unit toward the rear to remove it.
5. When attaching the knob holder on which the LED is installed, first turn the shaft fully clockwise, and then coil the wire twice around the shaft. Lastly, attach the holder, holding it in the position shown in the illustration (❺).

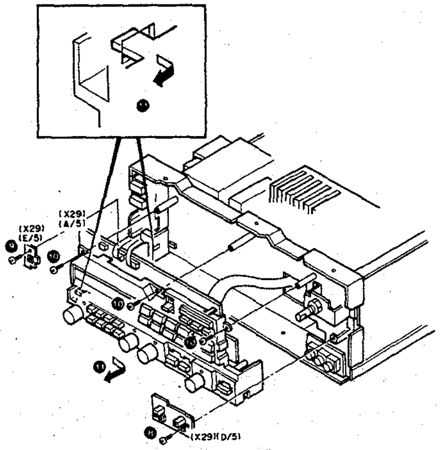


6. Remove both SPEAKER A and SPEAKER B knobs, then remove the 2 screws holding the Auxiliary Unit (X13-5830-11)(B/3) to the frame (❻).
7. Disengage the claws holding the PHONES jack to the frame as shown in the illustration (❼), and then separate the Auxiliary Unit (X13-)(B/3) by moving it toward the rear.

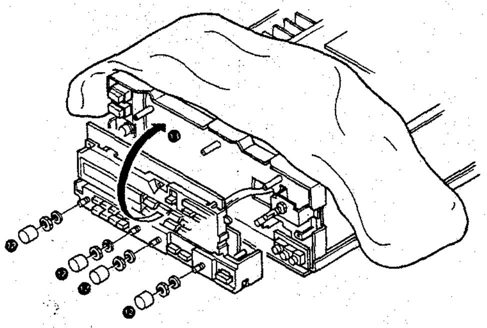


DISASSEMBLY FOR REPAIR

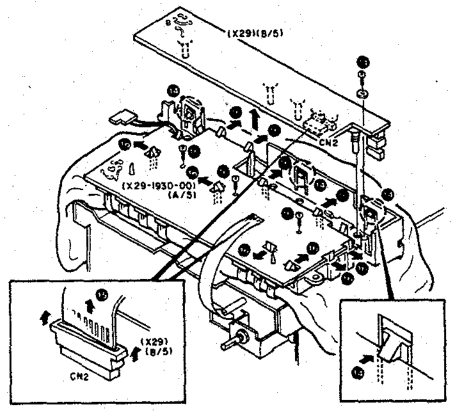
8. Remove the screw holding the Control Circuit Unit (X29-) (D/5) to the frame (❽).
9. Remove the screw holding the Control Circuit Unit (X29-) (E/5) to the frame (❾).
10. Remove the 3 screws holding the panel escutcheon to the frame (❿).
11. Disengage the Control Circuit Unit (X29-) (A/5, B/5) to which the panel escutcheon is attached in the direction of the arrow. At this time, carefully watch the panel escutcheon part which is inserted into the frame (⓫).



12. Remove the CALIBRATION, BASS, TREBLE and BALANCE control knobs, as well as the hex nuts and washers that go along with them (⓬).
13. Place a sheet of cloth on the set, and then place the Control Circuit Unit (X29-)(A/5, B/5) to which the panel escutcheon is attached on it, by turning the entire Control Unit in the direction of the arrow (⓭).

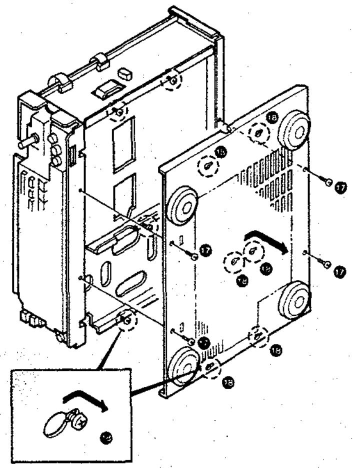


14. Remove the screw and disengage the 3 claws which hold the Control Circuit Unit (X29-)(B/5) to the panel escutcheon (⓮), and then take out the Control Circuit Unit (B/5) in the direction of the arrow.
15. Disconnect the parallel cable connected to CN2 of the Control Circuit Unit (X29-)(B/5) as shown in the illustration (⓯).
16. Remove the 3 screws and disengage the 10 screws which hold the Control Circuit Unit (X29-)(A/5) to the panel escutcheon (⓰), and then take out the Control Circuit Unit (A/5).

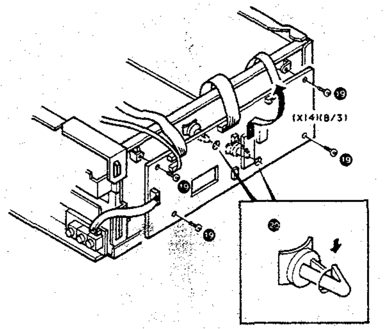


DISASSEMBLY FOR REPAIR

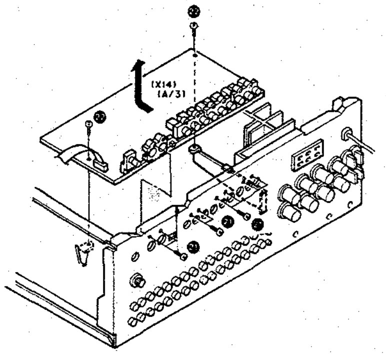
17. Stand the set as shown in the illustration, then remove the 4 screws from the bottom panel (⑰).
18. Loosen the 6 screws holding the bottom panel (⑱), and then take out the bottom panel in the direction of the arrow.



19. Remove the 4 screws holding the Video Control Unit (X14-2270-11)(B/3) to the right side frame (⑲).
20. Remove the unit holder, which holds the Video Control Unit (X14-)(B/3), by pushing the 2 claws in the direction of the arrows (⑳), and then take out the Video Control Unit (B/3) in the direction of the arrow.

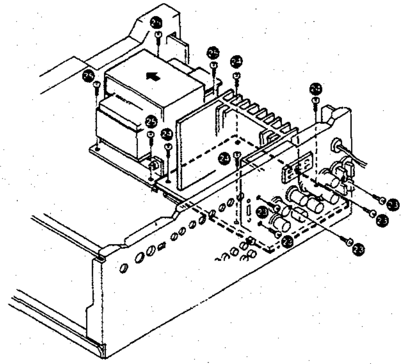


21. Remove the 8 screws holding the Video Control Unit (X14-) (A/3) to the rear panel (㉑).
22. Remove the other 2 screws holding the Video Control Unit (X14-) (A/3) (㉒), and then take out the Video Control Unit (A/3) in the direction of the arrow.

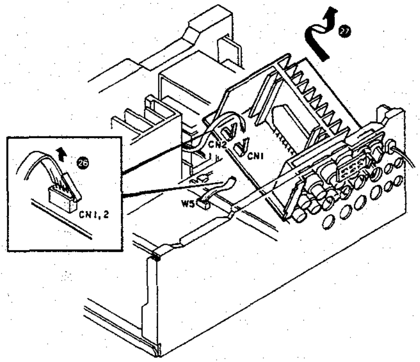


DISASSEMBLY FOR REPAIR

23. Remove the 5 screws holding the Auxiliary Unit (X13-) (A/3) to the rear panel (㉓).
24. Remove the other 4 screws holding the Auxiliary Unit (X13-) (A/3) (㉔).
25. Remove the 4 screws fixing the power transformer (㉕), and move the power transformer toward the front frame.

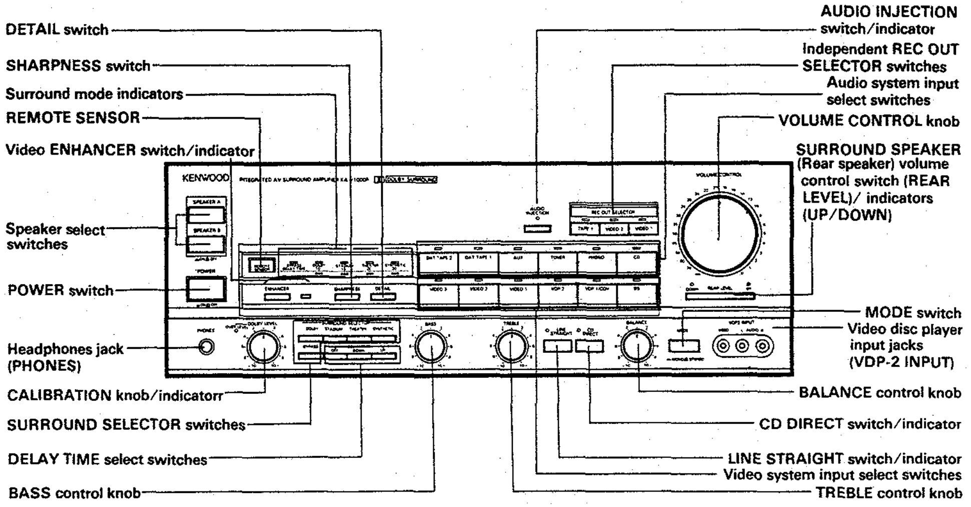


26. Disconnect the parallel cables from CN1 and CN2 of the Auxiliary Unit (X13-)(A/3) as shown in the illustration (㉖).
27. Take out the Auxiliary Unit (X13-)(A/3) in the direction of the arrow (㉗).

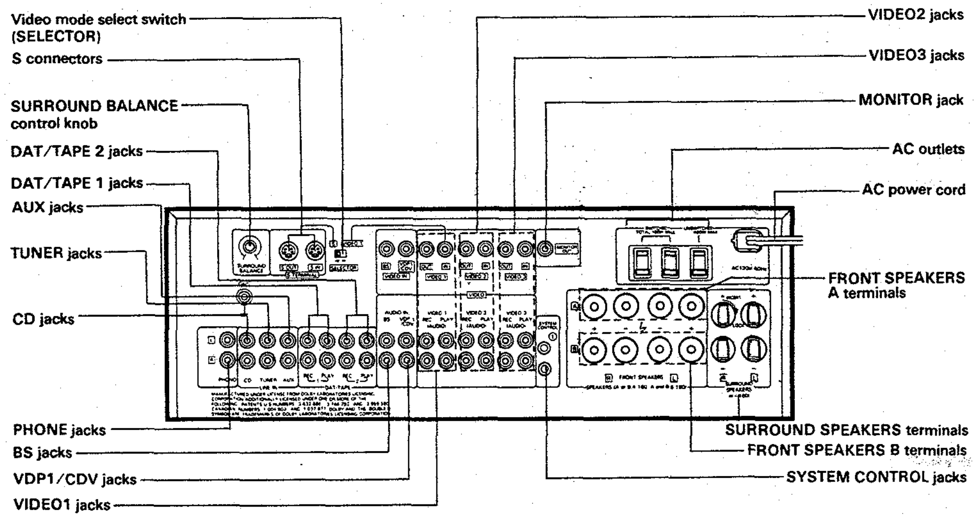


CONTROLS AND INDICATORS

Front panel


DETAIL switch
SHARPNESS switch
Surround mode indicators
REMOTE SENSOR
Video ENHANCER switch/indicator
Speaker select switches
POWER switch
Headphones jack (PHONES)
CALIBRATION knob/indicator
SURROUND SELECTOR switches
DELAY TIME select switches
BASS control knob
AUDIO INJECTION switch/indicator
Independent REC OUT SELECTOR switches
Audio system input select switches
VOLUME CONTROL knob
SURROUND SPEAKER (Rear speaker) volume control switch (REAR LEVEL)/ indicators (UP/DOWN)
MODE switch
Video disc player input jacks (VDP-2 INPUT)
BALANCE control knob
CD DIRECT switch/indicator
LINE STRAIGHT switch/indicator
Video system input select switches
TREBLE control knob

Rear panel


Video mode select switch (SELECTOR)
S connectors
SURROUND BALANCE control knob
DAT/TAPE 2 jacks
DAT/TAPE 1 jacks
AUX jacks
TUNER jacks
CD jacks
PHONE jacks
BS jacks
VDP1/CDV jacks
VIDEO1 jacks
VIDEO2 jacks
VIDEO3 jacks
MONITOR jack
AC outlets
AC power cord
FRONT SPEAKERS A terminals
SURROUND SPEAKERS terminals
FRONT SPEAKERS B terminals
SYSTEM CONTROL jacks

VIDEO ENHANCER

Video enhance effect

Unfortunately a video image may be deteriorated, ambiguous in color or fuzzy in detail. However, using the video enhancer, you can enjoy improved picture quality of the deteriorated image.

When adjusting the video enhancer effect, you will obtain a better result by referring to patterns of clothes or hair than by referring to a plane section.

DETAIL:

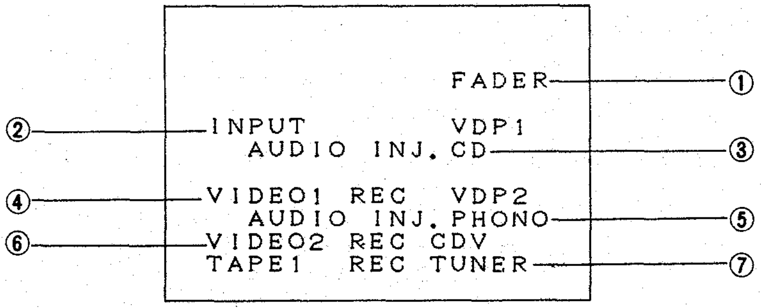
As this control switch is pressed, the details of the image are recovered or emphasized, thus providing a clearer image.

SHARPNESS:

As this control switch is pressed, the edges of the image are recovered or emphasized, thus providing a sharper image.

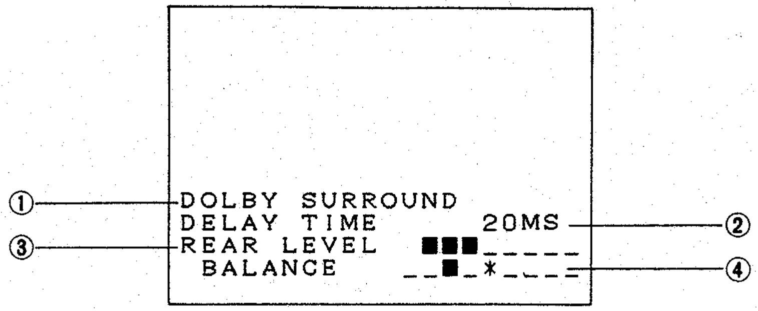
DISPLAY ON SCREEN

When operated with the selector switches, etc., the operating information will be displayed of monitor TV for about 5 seconds. Each time the MENU key on the remote control unit is operated, the display changes in the order screen 1 → screen 2 → screen 3 → OFF and it remains until the next operation is engaged.


FADER
INPUT VDP1
AUDIO INJ. CD
VIDEO1 REC VDP2
AUDIO INJ. PHONO
VIDEO2 REC CDV
TAPE1 REC TUNER
①
②
③
④
⑤
⑥
⑦

Display 1

① "FADER" is displayed while the fader is adjusted and it is cleared when adjustment is complete.
② The source selected by an input select switch is displayed.
③ The audio system source selected is displayed when the source side is in the audio injection mode.
④ The source applied to the REC jacks of VIDEO 1 is displayed. While waiting for a user source selection, "VIDEO 1 REC" flickers.
⑤ When the audio injection mode is set at the REC jacks of VIDEO 1, the audio system source selected is displayed.
⑥ The source applied to the REC jacks of VIDEO 2 is displayed. While waiting for a user source selection, "VIDEO 2 REC" flickers.
⑦ The source applied to the REC jacks of TAPE 1 is displayed. While waiting for a user source selection, "TAPE 1 REC" flickers.



```
DOLBY SURROUND
DELAY TIME      20MS
REAR LEVEL   ■■■_____
 BALANCE    __■_*____
```

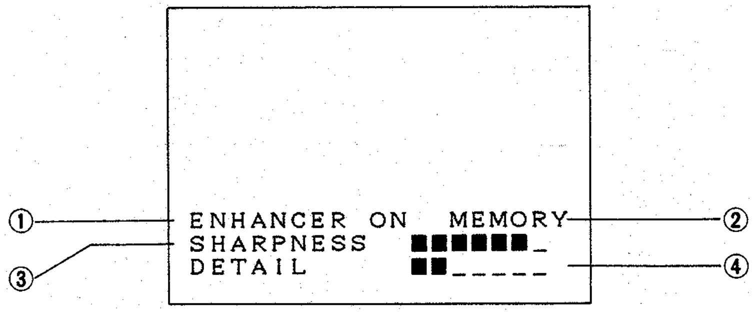
Display 2

① The surround mode selected by a SURROUND SELECTOR switch is displayed.

② The delay time is displayed. However, in case of the BYPASS or STADIUM mode, since the delay time need not be adjusted, "OFF" is displayed.

③ The rear level is displayed. As the level is raised, the number of markings (■) increases.

④ The rear balance is displayed. Normally, set the marking to the (*) position.



```
ENHANCER ON   MEMORY
SHARPNESS    ■■■■■■_
DETAIL       ■■_____
```

Display 3

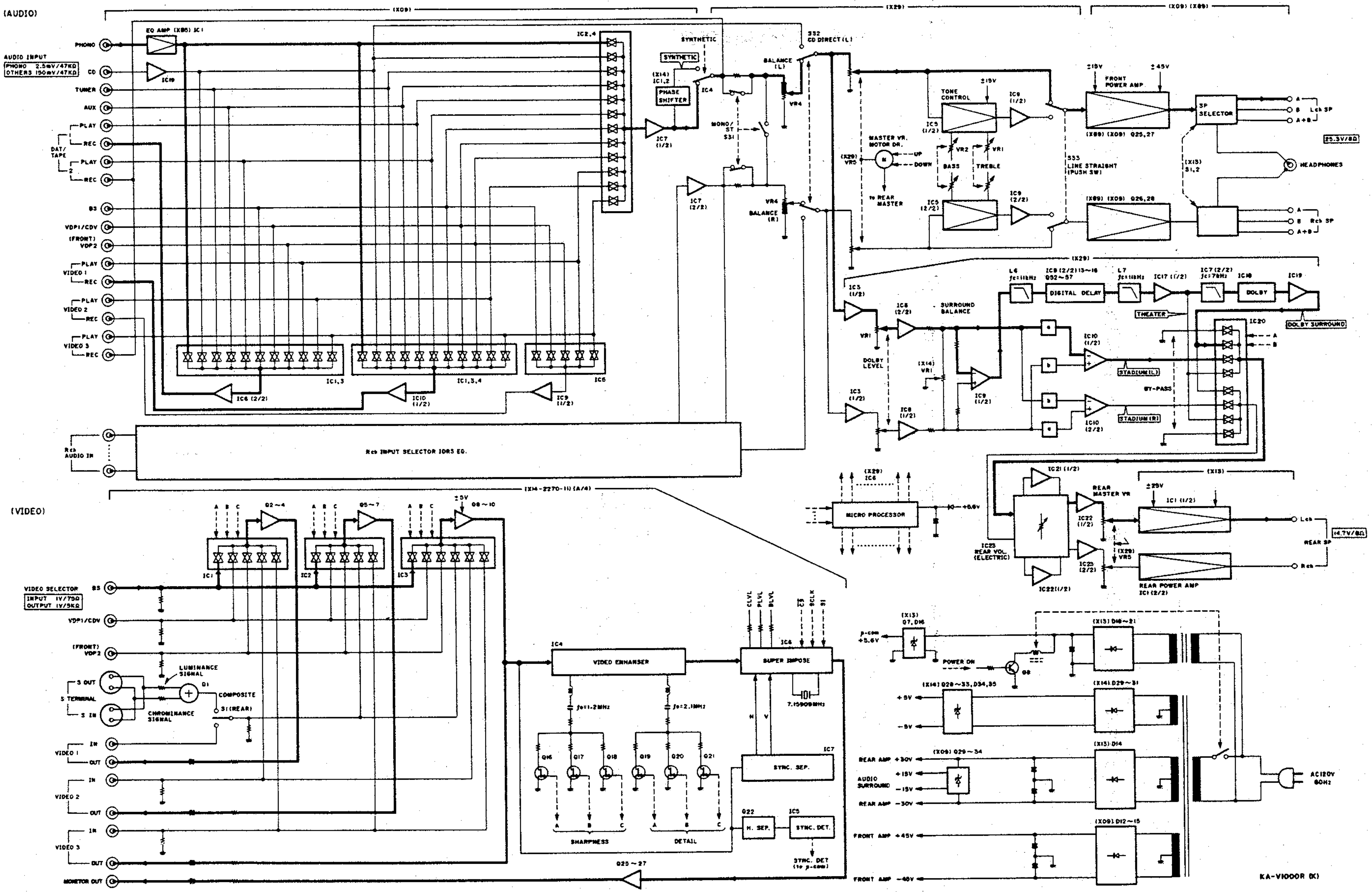
① "ON" is displayed while the enhancer is in operation, and "OFF" is displayed while the enhancer is not in operation. In addition, when the operation is avoided by memory reading, 1 — 4 is displayed.

② This display flickers to indicate that the memory is waiting to memorize the enhancer status. Usually, this display is not visible.

③ The emphasizing level of the image contours is displayed. The higher the emphasis, the greater the number of markings (■).

④ The emphasizing level of the image details is displayed. The higher the emphasis, the greater the number of markings (■).

BLOCK LEVEL DIAGRAM


(AUDIO)
(X09)
(X29)
(X09) (X89)
PHONO
AUDIO INPUT
PHONO 2.5mV/47KΩ
OTHERS 150mV/47KΩ
CD
TUNER
AUX
PLAY
REC
DAT/TAPE
BS
VDP1/CDV
(FRONT) VDP2
VIDEO 1
VIDEO 2
VIDEO 3
EQ AMP (X85) IC1
IC10
IC2,4
IC7 (1/2)
IC7 (2/2)
IC1,3
IC1,3,4
IC5
IC6 (2/2)
IC10 (1/2)
IC9 (1/2)
SYNTHETIC
PHASE SHIFTER
IC4
MONO/ST S31
BALANCE (L)
BALANCE (R)
VR4
S32 CD DIRECT (L)
TONE CONTROL
IC5 (1/2)
IC5 (2/2)
IC9 (1/2)
IC9 (2/2)
MASTER VR. MOTOR DR.
UP
DOWN
to REAR MASTER
BASS
TREBLE
VR2
VR1
S33 LINE STRAIGHT (PUSH SW)
FRONT POWER AMP
±15V
±45V
(X89) (X09) Q25,27
(X89) (X09) Q26,28
SP SELECTOR
(X15) S1,2
A
B
A+B
Lch SP
Rch SP
HEADPHONES
25.3V/8Ω
Rch AUDIO IN
Rch INPUT SELECTOR IDRS EQ.
L6 fc=11kHz
IC8 (2/2) Q52~57
DIGITAL DELAY
L7 fc=11kHz
IC17 (1/2)
IC7 (2/2) fc=7kHz
IC18
DOLBY
IC19
THEATER
DOLBY SURROUND
IC20
SURROUND BALANCE
DOLBY LEVEL
IC3 (1/2)
IC8 (2/2)
IC8 (1/2)
STADIUM (L)
STADIUM (R)
BY-PASS
IC10 (1/2)
IC10 (2/2)
MICRO PROCESSOR
+5.6V
(X29) IC6
IC21 (1/2)
REAR MASTER VR
IC22 (1/2)
IC23 REAR VOL. (ELECTRIC)
IC25 (2/2)
IC22 (1/2)
(X29) VR5
IC1 (1/2)
REAR POWER AMP IC1 (2/2)
Lch
Rch
REAR SP
14.7V/8Ω
(X13)
(VIDEO)
(X14-2270-11) (A/4)
A B C
Q2~4
Q5~7
Q8~10
+5V
IC1
IC2
IC3
VIDEO SELECTOR
INPUT 1V/75Ω
OUTPUT 1V/75Ω
BS
VDP1/CDV
(FRONT) VDP2
S OUT
S TERMINAL
S IN
LUMINANCE SIGNAL
CHROMINANCE SIGNAL
COMPOSITE
S1 (REAR)
D1
IN
OUT
VIDEO 1
VIDEO 2
VIDEO 3
MONITOR OUT
Q25~27
IC4
VIDEO ENHANSER
fc=1.2MHz
fc=2.1MHz
Q16
Q17
Q18
Q19
Q20
Q21
SHARPNESS
DETAIL
CLVL
PLVL
BLVL
S2
SCLK
SI
IC6
SUPER IMPOSE
7.15909MHz
H
V
IC7
SYNC. SEP.
Q22
H. SEP.
IC5
SYNC. DET.
SYNC. DET (to µ-com)
(X13) Q7,D16
µ-com +5.6V
POWER ON
Q8
(X13) D18~21
(X14) Q28~33, D34,35
(X14) D29~31
+5V
-5V
(X09) Q29~34
(X13) D14
REAR AMP +30V
AUDIO SURROUND +15V
-15V
REAR AMP -30V
(X09) D12~15
FRONT AMP +45V
FRONT AMP -45V
AC120V 60Hz
KA-V1000R (K)

KA-V1000R

CIRCUIT DESCRIPTION

DESCRIPTION OF COMPONENTS

Audio Unit (X09-2600-11)

Component	Use/Function	Operation/Condition/Compatibility
IC1 ~ 5 (IC1, 33: LC7821, IC2, 4: LC7822, IC5: LC7823)	Input signal select SWs	
IC6 (M5218L)	REC output	Buffer amplifier
IC7 (M5220L)	Source/REC output	Buffer amplifier
IC8 (LC4966)	Output signal selector SW	Outputs the REC signal at either TAPE2 or VIDEO3
IC9, 10 (M5218L)	REC output	Buffer amplifier
IC11 ~ 18 (KAZ01)	Static electricity protection	Protects the input circuitry
IC19 (M5218L)	Buffer IC	Protects the CD input circuit
Q1, 2	Muting SW	REC muting
Q3 ~ 6	IC18 controller	
Q7 ~ 10	Muting SW	REC muting
Q11 ~ 13	Muting driver	REC muting
Q21, 22	Muting SW	Power ON/OFF muting
Q23, 24	Temperature compensation	
Q25 ~ 28	Output	Speaker driver
Q29, 31, 33	Constant-voltage power control	Positive side
Q30, 32, 34	Constant-voltage power control	Negative side
D1, 2	Static electricity protection	
D3	Reset circuit diode	
D4, 5	Static electricity protection	
D6, 7	Serial communication	
D8 ~ 10	Constant-voltage	4.7V
D11		Absorbs counter-electromotive force during relay operation
D12 ~ 15	Rectifier	
D16	Rectifier	Detects AC for the protection IC
D17	Constant-voltage	5.1 V. Generates a reference voltage for the constant-voltage power supply.
D18	Constant-voltage	6.8V
D21 ~ 23	Muting	

Preamp Unit (X85-1030-13) <DT1>

Component	Use/Function	Operation/Condition/Compatibility
IC1 (μPC4570C)	Equalizer amp	

CIRCUIT DESCRIPTION

Main Amp Unit (X89-1020-12) <DT2>

Component	Use/Function	Operation/Condition/Compatibility
IC1 (1μPC1237HA)	Protection	
Q1 ~ 4	Class A 1st-stage differential amp	
Q5 ~ 8	Class A 1st-stage cascade circuit	
Q9 ~ 12	Class A 2nd-stage differential amp	
Q13 ~ 16	Class A 3rd-stage differential amp	
Q17, 18	Class A cascade circuit	
Q19, 20	Class A current mirror circuit	
Q21 ~ 24	Predriver	
Q28	Current limiter	Limits current to the final Tr in case of overload drive
Q25, 29	Protection driver	When the current limiter is turned on, transmits its output signal to the protection IC (IC1).
D1, 2	Cascode base potential maintenance	
D3, 4	Current mirror VBE compensation	
D5 ~ 8	Reverse current prevention	

Sub-Circuit Unit (X13-5830-11)

Component	Use/Function	Operation/Condition/Compatibility
IC1 (STK-4142/2) 1/2	Power amp	25W/8Ω, Gv = 43.4dB L CH
2/2	Power amp	25W/8Ω, Gv = 43.4dB R CH
Q1, 2	Muting	Control voltage is 4.8V when ON, −14V when OFF.
Q3	Power ON/OFF shock noise prevention	Turns ON at the rise of +B and −B of IC1. Normally OFF.
Q4	Output short-circuit muting control	Turns ON if the output is short-circuited while the power is above a certain level.
Q5	Muting control	Turns ON/OFF based on signals from the microprocessor and Q4.
Q6	IC1 muting control	Controls muting for prevention of shock noise when the power IC is turned ON/OFF.
Q7	Constant-voltage	5.6V regulated voltage for the microprocessor circuitry
Q8	Relay driver	Drives the main power ON/OFF relay
D1, 2	Power ON/OFF shock noise prevention	
D3, 4	Output signal half-wave rectifier	
D5, 6	OR circuit diodes	OR circuit for L CH and R CH signals (when the output is short-circuited)
D7, 8, 13	Control	
D9, 12	Switching	Prevents reverse current when power is turned OFF
D10	Constant-voltage	−14 ~ −15V
D11	Chemical capacitor discharging	
D14	Bridge rectifier	
D15	Half-wave rectifier	
D16	Constant-voltage	
D17	Relay OFF reverse inverted voltage shorting	
D18 ~ 21	Bridge rectifier	

CIRCUIT DESCRIPTION

Video Control Unit (X14-2270-11)

Component	Use/Function	Operation/Condition/Compatibility
IC1 ~ 3(TC4051BP)	Video signal selector	3 control signals (pins 9 to 11) are used to select one of the 6 video input signals; BS, VDP-1, VDP-2 and VIDEO1 to VIDEO3.
IC4(MB88305)	I/O expander	Outputs the control signals (3 x 3) for the video signal selector ICs (IC1 to IC3), control signals (3 x 2) for the video enhancer and the VIDEO3 REC OUT muting control signal.
IC5(NJM2220S)	Horizontal sync signal detector	Detects whether the horizontal sync signal is normal or not
IC6(MB88323A-K2)	Superimpose	Superimposes character information on the monitor output signal
IC7(LA7820)	Sync separator	Separates the horizontal and vertical sync signals from the video signal
IC8(M5218P-A)	Buffer amp	1/2 for R CH, 2/2 for L CH
IC9(M5218P-A) 1/2	Differential amp	Generates the −L +R signal
2/2	Sample & hold (S/H)	Amplifier in the S/H circuit for the A/D converter.
IC10(M5218P-A)	Stadium signal synthesizer	L = a(f)L − b(F)R, R = a(f)R − b(f)L, where a(f) and b(f) are functions of the frequency.
IC11(TC4053BP)	S/H electronic SW	The S/H signal (about 34 kHz) from the gate array (IC14) is used to sample the mechanism signal.
IC12(TL810CP)	High-speed comparator	Compares the levels of the S/H output signal and the D/A converter output signal.
IC13(PCM54HP)	D/A converter	16-bit D/A converter. This forms a part of the A/D converter.
IC14 (μPD65012ĆW-220)	Digital delay and A/D converter control	Controls the D/A converter, outputs the S/H control signal, performs memory control, and controls the D/A converter for the A/D converter.
IC15(PCM56P)	D/A converter	16-bit D/A converter
IC16(TMM2115BP-15)	Memory	16K (8 x 2K bits) SRAM
IC17(M5218P-A) 1/2	Buffer amp	
2/2	32 Active LPF	Tertiary LPF for Dolby Surround, fc = 7 kHz
IC18(NE645N)	Dolby decoder	Used for Dolby Surround effect
IC19(M5218P-A) 1/2	Buffer amp	
2/2	Dolby Surround	Forms a part of the Dolby Surround circuit
IC20(TC4052BP)	Surround selector	Selects one of the 4 Surround positions; THEATER, STADIUM, DOLBY SURROUND or BYPASS.
IC21(M5218L) 1/2	Electronic VR buffer amp	
2/2	Output buffer amp	
IC22(M5218L) 1/2	Electronic VR buffer amp	
2/2	Output buffer amp	
IC23(LC7535)	Electronic VR	Based on the 3 control signals, attenuates the signals from 0 to −80 dB in 1 dB steps.
Q1	CY adder	Adds the chroma (C) and luminance (Y) signals
Q2 ~ 10	Video amp Tr	Gv = about 12 dB and f = max. 8 MHz (−3 dB) for +5.5V operation.
Q11	Muting	Mutes the VIDEO3 REC signal
Q12	Inversion driver	Drives muting transistor Q11
Q13 ~ 15	Vide amp	Video amp for the video enhancer
Q16 ~ 18	Switch	Series SW for switching the sharpness level
Q19 ~ 21	Switch	Series SW for switching the detail level
Q22	Horizontal sync separator	
Q23	Buffer	Vertical sync signal buffer
Q24	Buffer	Horizontal sync signal buffer

CIRCUIT DESCRIPTION

Component	Use/Function	Operation/Condition/Compatibility
Q25 ~ 27	Video amp	Same as Q2 to A10
Q28, 29	Current booster	Current booster for the constant-voltage power supply
Q30, 31	Error amp	Error amp for the constant-voltage power supply
Q32, 33	Current booster	Current booster for the constant-voltage power supply
Q51	Buffer amp	Sets the S/H amp input to a high impedance.
Q52 ~ 55	Preamp	Preamp of the high-speed comparator (IC12)
Q56, 57	Buffer amp	
D1 ~ 12	Input protection	Turns ON when a noise pluse of 4.5 V or more is input.
D13	Voltage shifting	Generates a −0.6V voltage
D14 ~ 16	Level shifting	Shifts the 0.6V level (voltage)
D17	Clamping	
D18 ~ 20	Switch	Used for switching the sharpness level
D21 ~	Switch	Used for switching the detail level
D24	Voltage shifting (bias generation)	Generates a bias voltage of +B −0.6V.
D25	Clamping	
D26	Temperature compensation	
D27	Level shifting	Same as D14 to D16
D28	Constant-voltage	
D29 ~ 32	Bridge rectifier	
D33	Reset circuit discharging	
D34, 35	Voltage regulator	
D36 ~ 45	Static electricity protection	
D51, 53	Constant-voltage	6.2V
D52	Constant-voltage	11V
D54	Level shifting	Shifting of the 0.6 V voltage
D55	Reset circuit discharging	
D56 ~ 59	Static electricity protection	
D61 ~ 64	Voltage limiter	

CIRCUIT DESCRIPTION

Control Circuit Unit (X29-1930-00)

Component	Use/Function	Operation/Condition/Compatibility
IC1, 2(M5218P-A)	Phase shifter	For the synthetic circuit
IC3(M5218P-A)	Buffer	Rear signal output
IC4(TC4053BP)	Switch	Switching between the synthetic signal and the source signal
IC5(μPC4570C)	Tone control	
IC6 (μPD75106CW-076)	Microprocessor	Performs source switching control, muting control, switching control and LED control.
IC7(MB88304-P)	Expansion I/O	Used for lighting the LEDs
IC8(BA6229)	Motor VR driver	
IC9(μPC4570C)	Buffer	Tone control circuit signal output buffer
Q1	Constant-current	Edge light LED
Q2, 3	Constant-voltage	Used for switching the 5V control. 5V is turned OFF when power is turned OFF.
Q4, 5	Power failure reset circuit	Q4 turns OFF when a power failure occurs. When the power supply is turned back ON, Q5 turns ON in about 60 ms.
Q6 ~ 11	Buffer	For lighting the LEDs
Q12	Voltage control	Controls the motor drive voltage
Q27	Voltage control	Normally ON. OFF for the fader
D1, 2		Used for input protection of IC4 (TC4053BP). The signal is the L CH signal.
D3, 4		Display LEDs
D5, 6		Used for the power supply to IC4
D10		For the edge light and constant current of the LEDs
D11		For dropping the 5.6V voltage
D12		For generating the reset and power-failure pulse.
D13 ~ 15		For preventing reverse current of the backup power
D16		For dropping the 5.6V voltage
D17		For determining the reference voltage when generating a power-failure pulse
D18		For generating the reset and power-failure pulse
D19 ~ 26		For key scanning
D27		Motor drive volume. Normally, UP, DOWN and fader.
D28 ~ 61		Display LED
D62		For protection of the synthetic circuit switching control signal

CIRCUIT DESCRIPTION

1. DIGITAL DELAY CIRCUIT OPERATION

The delay circuit in the Surround circuitry of the KA-V1000R uses a digital delay (D.DELAY) circuit in place of an ordinary BBD. A D.DELAY is used in order to improve the S/N ratio, which used to be a problem with BBD circuit. The D.DELAY delays the (L-R) analog signal by digitizing it by PCM and temporarily storing the digital data in memory. First, to prevent loopback noise, the signal components above 11 kHz are eliminated by the LPF of L6. Then the signal is sampled & held by the sample & hold (S/H) amp formed by IC11 and IC9. The S/H output is compared to the IC13 D/A converter output, which is controlled by IC14 (digital delay and A/D converter controller) and by the comparator circuit made up of the preamp of Q52 to Q55 and high-speed comparator IC12, and the comparison result is sent to IC14. This comparison is repeated 16 times (16 bits) in 1 hold period (1/fsH < 1/34 kHz) and, when the 16-bit digital data of 1 hold period (1 sample) is complete, it is then stored in SRAM IC16. The SRAM can store data for a maximum of 30 ms.

The function of IC14 is to create a delay time according to the signal, by generating SRAM read/write timings based on the external signal (delay value data output from the microprocessor), as well as to output the PCM signal to D/A converter IC15.

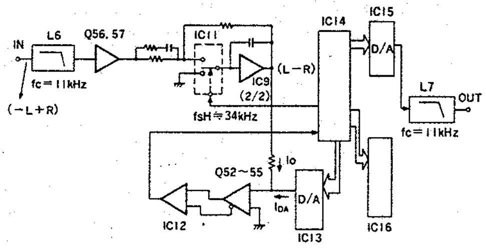

IN
L6
Q56, 57
IC11
IC9 (2/2)
(L−R)
IC14
IC15
D/A
L7
OUT
fc = 11kHz
(−L+R)
fsH ≒ 34kHz
fc = 11kHz
Q52 ~ 55
Io
IDA
D/A
IC12
IC13
IC16

Fig. 1

2. VIDEO ENHANCER CIRCUIT

Two series resonance circuits having different fo's are provided in the feedback circuit of the video amp, and the frequency characteristic is varied by damping Q of the series resonance circuits using the resistors. The resistance is varied using the fixed resistors and the FET switch. As the value uses three bits, the value can be varied in 8 steps (including no adjustment).

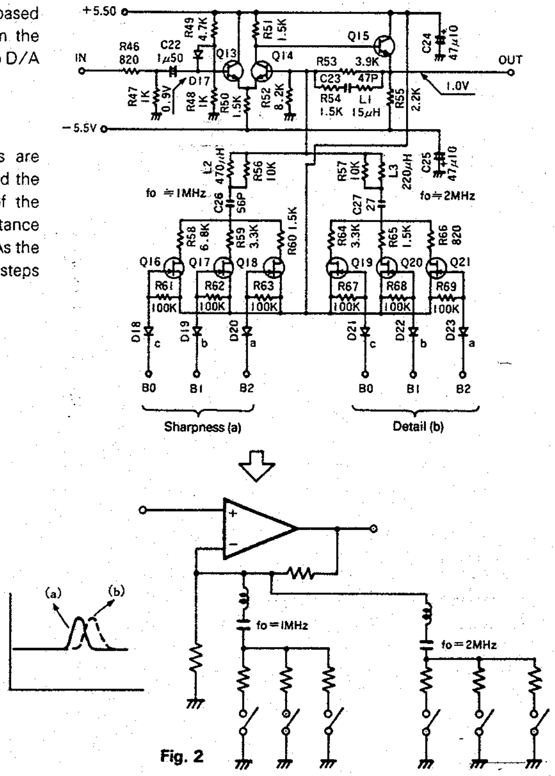

+5.50
IN
OUT
−5.5V
R46 820
C22 1μ50
R47 1K
0.9V
D17
R48 1K
R49 4.7K
Q13
Q14
R50 1.5K
R51 1.5K
R52 8.2K
Q15
R53 3.9K
C23 47P
R54 1.5K
L1 15μH
R55 2.2K
C24 47μ10
1.0V
L2 470μH
C26 56P
R56 10K
R57 10K
L3 220μH
C27 27
C25 47μ10
fo ≒ 1MHz
fo ≒ 2MHz
R58 6.8K
R59 3.3K
R60 1.5K
R64 3.3K
R65 1.5K
R66 820
Q16
Q17
Q18
Q19
Q20
Q21
R61 100K
R62 100K
R63 100K
R67 100K
R68 100K
R69 100K
D18 c
D19 b
D20 a
D21 c
D22 b
D23 a
B0
B1
B2
B0
B1
B2
Sharpness (a)
Detail (b)
(a)
(b)
fo = 1MHz
fo = 2MHz

Fig. 2

CIRCUIT DESCRIPTION

3. SYNC SIGNAL DETECTOR

Q22 is the horizontal sync separator transistor, which turns on during the H sync period of the video signal input from VIDEO IN. IC5 is used to detect whether the sync signal is normal or not, and its detection signal output is "High" when a normal sync signal, as shown in Fig. 3-1, is input. The output goes "Low" when the sync signal is separated by more than the usual amount due to noise (Fig. 3-2), or when the sync signal cannot be separated because a video signal is not input.

When the "Low" output is input to the SYNC terminal (pin 2) of microprocessor IC6 (X29-), the video sync is judged to be out of sync and an internal sync is selected, providing a blue background.

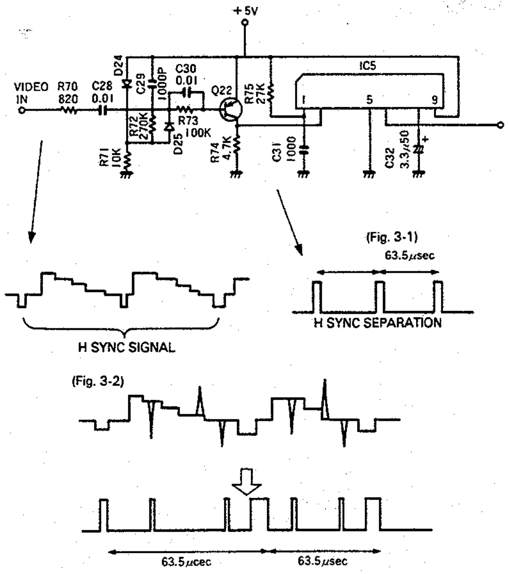

+5V
VIDEO IN
R70 820
C28 0.01
D24
C29 1000P
C30 0.01
Q22
R75 27K
IC5
1
5
9
R72 270K
R73 100K
D25
R71 10K
R74 4.7K
C31 1000
C32 3.3/50
(Fig. 3-1)
63.5μsec
H SYNC SIGNAL
H SYNC SEPARATION
(Fig. 3-2)
63.5μcec
63.5μsec

Fig. 3

4. SUPERIMPOSE CIRCUIT

4-1. When superimposing characters on the external video signal

The video signal input to IC6 via pin 14 is output at pin 12 (VOM) through the internal analog switch (3). When the position for superimposing a character comes, switch (3) is turned OFF and switch (2) is turned ON. At this moment, the voltage level at pin 15 is output at VOM, and a dark signal is output if the level is low. Then, switch (2) is turned OFF, switch (4) is turned ON, and the level at pin 13 is output. The level at pin 13 is higher than that at pin 15, thereby closer to white. In this way, by turning analog switches (2), (3) and (4) ON and OFF, two levels of signals can be superimposed on the video signal. (These two levels refer to the character signal and character edge signal.)

4-2. When generating an internal video signal

The IC can generate and output a video signal when an external video signal is not input. In this case, analog switch (1) is ON while the others are OFF. The internal video signal is generated by dividing 7.15909 MHz (which is twice the color subcarrier).

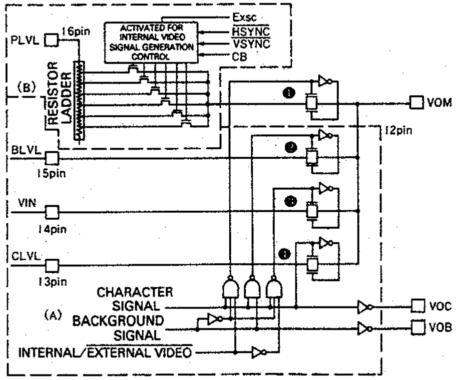
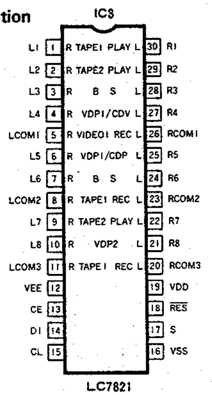

PLVL
16pin
ACTIVATED FOR INTERNAL VIDEO SIGNAL GENERATION CONTROL
Exsc
HSYNC
VSYNC
CB
(B)
RESISTOR LADDER
❶
VOM
❷
12pin
BLVL
15pin
❸
VIN
14pin
❹
CLVL
13pin
CHARACTER SIGNAL
(A)
BACKGROUND SIGNAL
INTERNAL/EXTERNAL VIDEO
VOC
VOB

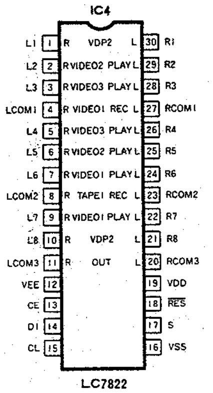
Fig. 4 Analog Switches in IC6 (MB88323A-K2)

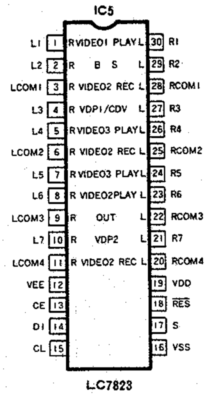
CIRCUIT DESCRIPTION

IC1, IC3 (X09-2600-11): LC7821
IC2, IC4 (X09-2600-11): LC7822
IC5 (X09-2600-11): LC7823
Analog Function Switches

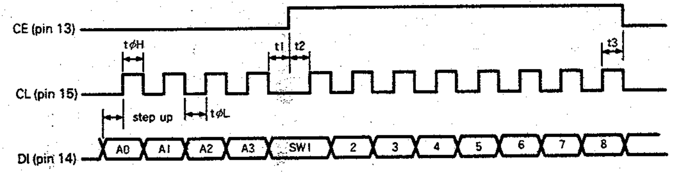
Pin Configuration


IC3
L1 1 R TAPE1 PLAY L 30 R1
L2 2 R TAPE2 PLAY L 29 R2
L3 3 R B S L 28 R3
L4 4 R VDP1/CDV L 27 R4
LCOM1 5 R VIDEO1 REC L 26 RCOM1
L5 6 R VDP1/CDP L 25 R5
L6 7 R B S L 24 R6
LCOM2 8 R TAPE1 REC L 23 RCOM2
L7 9 R TAPE2 PLAY L 22 R7
L8 10 R VDP2 L 21 R8
LCOM3 11 R TAPE1 REC L 20 RCOM3
VEE 12
19 VDD
CE 13
18 RES
DI 14
17 S
CL 15
16 VSS
LC7821


IC4
L1 1 R VDP2 L 30 R1
L2 2 R VIDEO2 PLAY L 29 R2
L3 3 R VIDEO3 PLAY L 28 R3
LCOM1 4 R VIDEO1 REC L 27 RCOM1
L4 5 R VIDEO3 PLAY L 26 R4
L5 6 R VIDEO2 PLAY L 25 R5
L6 7 R VIDEO1 PLAY L 24 R6
LCOM2 8 R TAPE1 REC L 23 RCOM2
L7 9 R VIDEO1 PLAY L 22 R7
L8 10 R VDP2 L 21 R8
LCOM3 11 R OUT L 20 RCOM3
VEE 12
19 VDD
CE 13
18 RES
DI 14
17 S
CL 15
16 VSS
LC7822

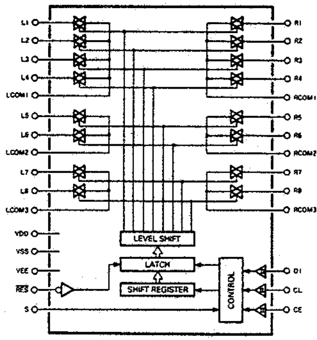

IC5
L1 1 R VIDEO1 PLAY L 30 R1
L2 2 R B S L 29 R2
LCOM1 3 R VIDEO2 REC L 28 RCOM1
L3 4 R VDP1/CDV L 27 R3
L4 5 R VIDEO3 PLAY L 26 R4
LCOM2 6 R VIDEO2 REC L 25 RCOM2
L5 7 R VIDEO3 PLAY L 24 R5
L6 8 R VIDEO2PLAY L 23 R6
LCOM3 9 R OUT L 22 RCOM3
L7 10 R VDP2 L 21 R7
LCOM4 11 R VIDEO2 REC L 20 RCOM4
VEE 12
19 VDD
CE 13
18 RES
DI 14
17 S
CL 15
16 VSS
LC7823

CE, CL and DI Waveforms

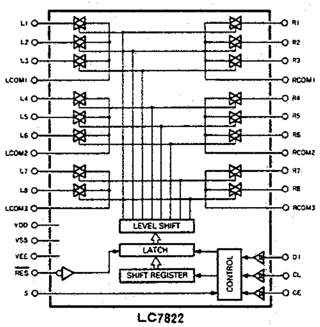

CE (pin 13)
tφH
t1
t2
t3
CL (pin 15)
step up
tφL
DI (pin 14)
A0
A1
A2
A3
SW1
2
3
4
5
6
7
8

CIRCUIT DESCRIPTION

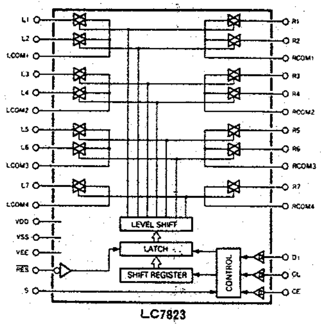
Equivalent Circuit Block Diagram


L1
L2
L3
L4
LCOM1
L5
L6
LCOM2
L7
L8
LCOM3
VDD
VSS
VEE
RES
S
R1
R2
R3
R4
RCOM1
R5
R6
RCOM2
R7
R8
RCOM3
LEVEL SHIFT
LATCH
SHIFT REGISTER
CONTROL
DI
CL
CE

LC7821


L1
L2
L3
LCOM1
L4
L5
L6
LCOM2
L7
L8
LCOM3
VDD
VSS
VEE
RES
S
R1
R2
R3
RCOM1
R4
R5
R6
RCOM2
R7
R8
RCOM3
LEVEL SHIFT
LATCH
SHIFT REGISTER
CONTROL
DI
CL
CE

LC7822


L1
L2
LCOM1
L3
L4
LCOM2
L5
L6
LCOM3
L7
LCOM4
VDD
VSS
VEE
RES
S
R1
R2
RCOM1
R3
R4
RCOM2
R5
R6
RCOM3
R7
RCOM4
LEVEL SHIFT
LATCH
SHIFT REGISTER
CONTROL
DI
CL
CE

LC7823

Explanation of Pins

<table>
<tr><th>Pin Name</th><th>I/O</th><th>Internal Equivalent Circuit</th><th>Function</th></tr>
<tr><td>V_{EE}</td><td rowspan="3"></td><td rowspan="3"></td><td rowspan="3">Power supply terminals</td></tr>
<tr><td>V_{SS}</td></tr>
<tr><td>V_{DD}</td></tr>
<tr><td>L1 ~ L8, R1 ~ R8,
LCOM1 ~ LCOM4,
RCOM1 ~ RCOM4</td><td>I
O</td><td>See block diagram</td><td>Analog switch input/output terminals</td></tr>
<tr><td>CE</td><td rowspan="3">I</td><td rowspan="3"> </td><td rowspan="3">Serial data input terminals (Schmitt buffer)
CE .... Chip Enable terminal
DI .... Data Input terminal
CL .... CLock input terminal</td></tr>
<tr><td>DI</td></tr>
<tr><td>CL</td></tr>
<tr><td>S</td><td>I</td><td> </td><td>Selects the terminal when the 2 are used.
The address varies as follows, depending on whether the S terminal is L or H.
<table>
<tr><th rowspan="2">Part</th><th rowspan="2">S Status</th><th colspan="4">Address</th></tr>
<tr><th>A0</th><th>A1</th><th>A2</th><th>A3</th></tr>
<tr><td rowspan="2">LC7821</td><td>L</td><td>0</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td>H</td><td>1</td><td>1</td><td>0</td><td>1</td></tr>
<tr><td rowspan="2">LC7822</td><td>L</td><td>0</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td>H</td><td>1</td><td>0</td><td>1</td><td>1</td></tr>
<tr><td rowspan="2">LC7823</td><td>L</td><td>0</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>H</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
</table></td></tr>
<tr><td>$\overline{RES}$</td><td>I</td><td> </td><td>Reset terminal
The analog switch statuses are unstable when power is turned ON: All analog switches are turned OFF when this terminal is set Low.</td></tr>
</table>

CIRCUIT DESCRIPTION

OPERATION DESCRIPTION

1. Data Input Method

To control LC7821, LC7822 and LC7823, the specified serial data shall be input to the CL, DI and E terminals. This data consists of a total of 12 bits, with 4 address bits and 8 data bits.

1st bit　　　　last bit

A0	AI	A2	A3	SWI	2	3	4	5	6	7	8
Address				Data							

As the switch Nos. correspond to analog switches L1 to L8 and R1 to R8, the bits for the switches to be turned ON are set to "1".

0 ..... OFF

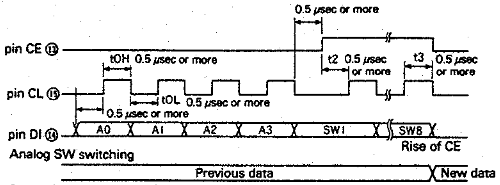
1 ..... ON

The address is used for chip selection when the circuits are connected to a common balance. The transmission data varies depending on the S terminal status as follows.

Name	S Status	Address			
		A0	A1	A2	A3
LC7821	L	0	1	0	1
	H	1	1	0	1
LC7822	L	0	0	1	1
	H	1	0	1	1
LC7823	L	0	1	1	1
	H	1	1	1	1

Note: With LC7823, the SW8 bit is "don't care" (can be either 0 or 1). This is because LC7823 incorporates only 7 x 2 analog switches.

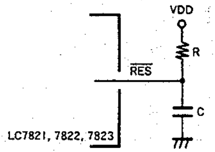
2. Timings of DI, CL and CE

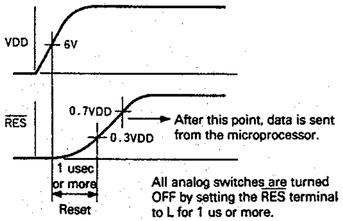

tl
0.5 μsec or more
pin CE ⑪
tOH 0.5 μsec or more
t2 0.5 μsec or more
t3 0.5 μsec or more
pin CL ⑮
tOL 0.5 μsec or more
0.5 μsec or more
pin DI ⑭
A0
AI
A2
A3
SWI
SW8
Rise of CE
Analog SW switching
Previous data
New data

Data is input at the rise of CL and latched at the fall of CE.

3. Note on the reset terminal

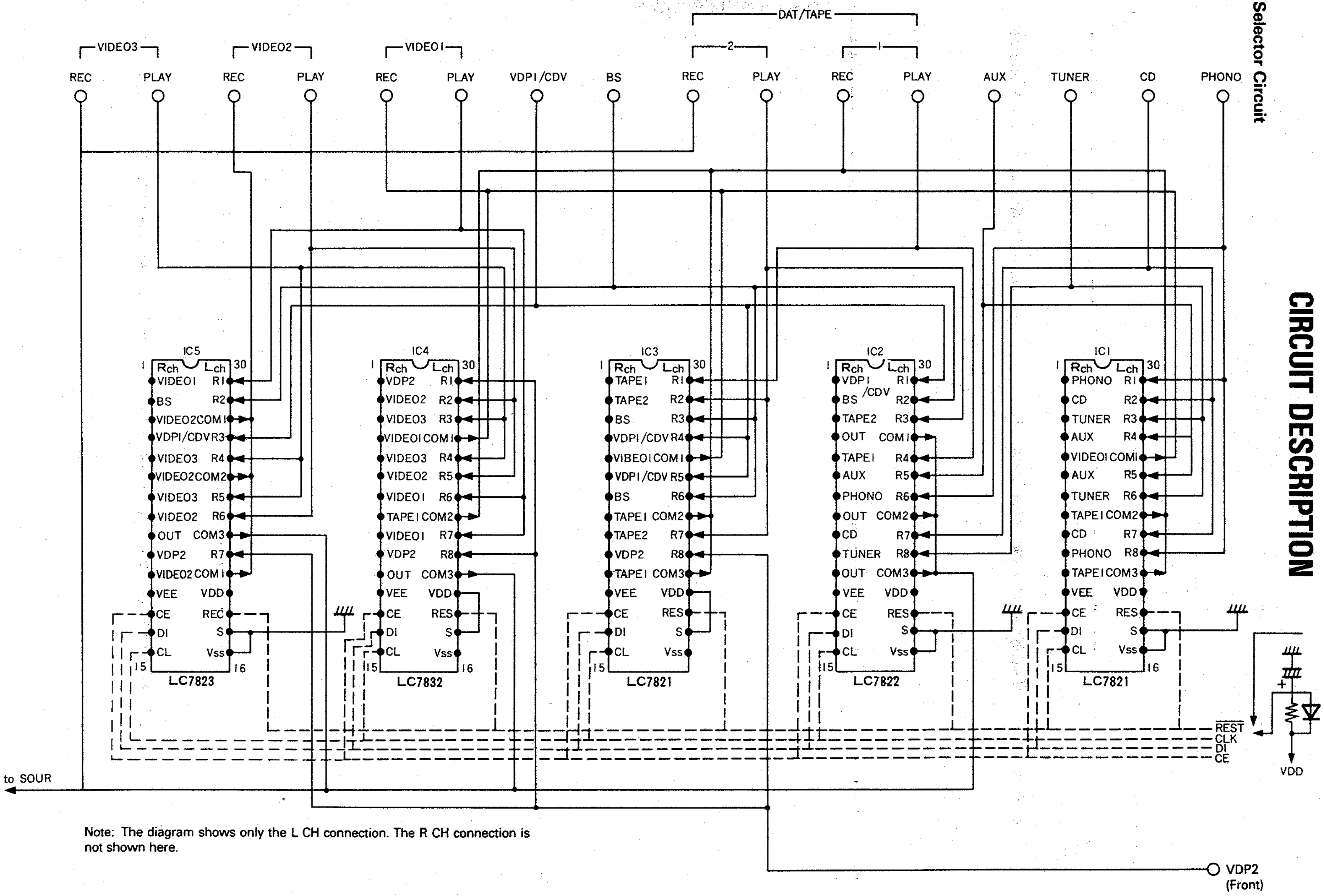
The analog switch statuses are unstable when power is turned ON: All analog switches are turned OFF when an external C and R are connected to this terminal.


VDD
R
RES
C
LC7821, 7822, 7823


VDD
6V
RES
0.7VDD
0.3VDD
After this point, data is sent from the microprocessor.
1 usec or more
Reset
All analog switches are turned OFF by setting the RES terminal to L for 1 us or more.

CIRCUIT DESCRIPTION

Input Selector Circuit


DAT/TAPE
VIDEO3
VIDEO2
VIDEO1
2
1
REC
PLAY
VDP1/CDV
BS
AUX
TUNER
CD
PHONO
IC5
IC4
IC3
IC2
IC1
Rch
Lch
LC7823
LC7832
LC7821
LC7822
LC7821
VEE
VDD
CE
DI
CL
RES
S
Vss
REST
CLK
DI
CE
VDD
to SOUR
VDP2
(Front)

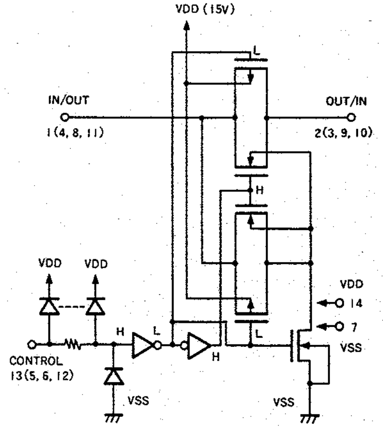
Note: The diagram shows only the L CH connection. The R CH connection is not shown here.

CIRCUIT DESCRIPTION

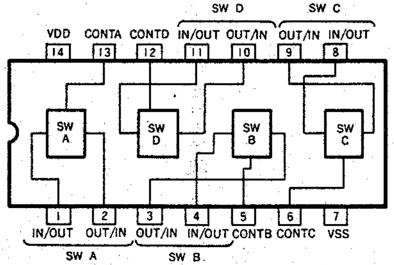
IC8 (X09-2600-11): LC4966

CMOS Logic Bilateral Switch

Equivalent Circuit (1/4 circuit)


VDD (15V)
L
IN/OUT
1(4, 8, 11)
OUT/IN
2(3, 9, 10)
H
VDD
VDD
H
L
H
L
CONTROL
13(5, 6, 12)
VSS
VDD
14
7
VSS
VSS

Pin Configuration, Equivalent Circuit Block Diagram


SW D
SW C
VDD
CONTA
CONTD
IN/OUT
OUT/IN
OUT/IN
IN/OUT
14
13
12
11
10
9
8
SW A
SW D
SW B
SW C
1
2
3
4
5
6
7
IN/OUT
OUT/IN
OUT/IN
IN/OUT
CONTB
CONTC
VSS
SW A
SW B

Truth Table

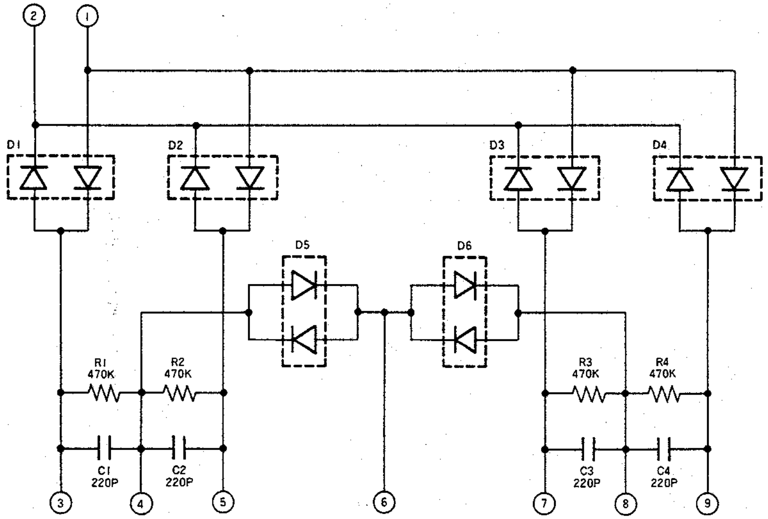
Control (CA ~ CD)	Switch (A ~ C)
H	ON
L	OFF

CIRCUIT DESCRIPTION

IC11 ~ IC18 (X09-2600-11): KAZ01

Static Electricity Protection Custom ICs

Circuit Configuration



②
①
D1
D2
D3
D4
D5
D6
R1 470K
R2 470K
R3 470K
R4 470K
C1 220P
C2 220P
C3 220P
C4 220P
③
④
⑤
⑥
⑦
⑧
⑨

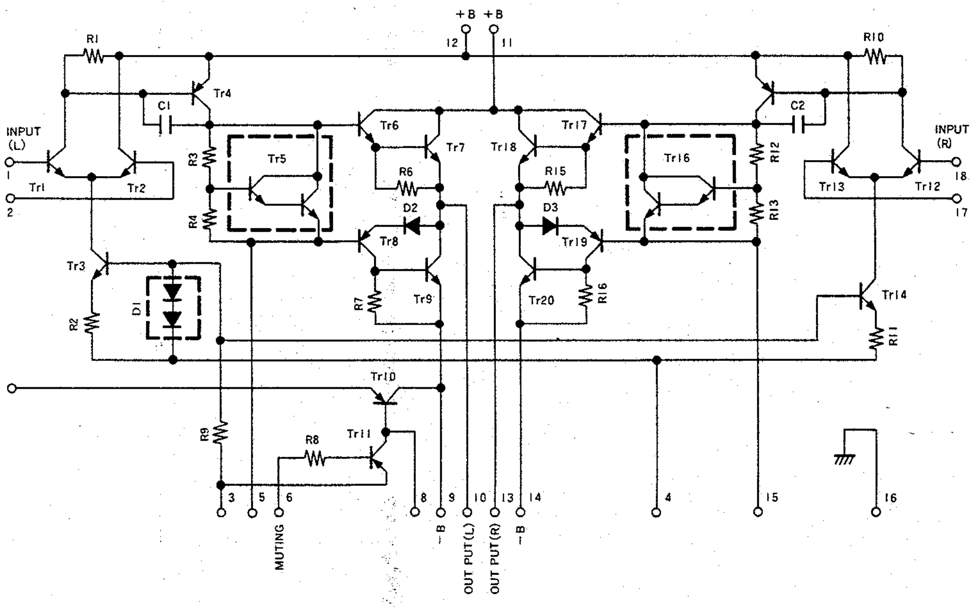
D1~6 : 1SS226

CIRCUIT DESCRIPTION

IC1 (X13-5830-11): STK-4142/2

2-CH AF Power Amp IC

Equivalent Circuit Block Diagram



+B +B
12
11
R1
R10
Tr4
C1
C2
INPUT (L)
INPUT (R)
1
2
18
17
Tr1
Tr2
Tr3
Tr5
Tr6
Tr7
Tr8
Tr9
Tr10
Tr11
Tr12
Tr13
Tr14
Tr16
Tr17
Tr18
Tr19
Tr20
R2
R3
R4
R6
R7
R8
R9
R11
R12
R13
R15
R16
D1
D2
D3
3
5
6
8
9
10
13
14
4
15
16
MUTING
-B
OUT PUT (L)
OUT PUT (R)
-B

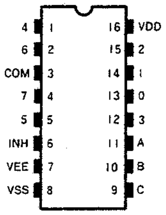
CIRCUIT DESCRIPTION

IC1 ~ IC3 (X14-2270-11): TC4051 BA BP
IC20 (X14-2270-11): TC4052BP
IC11 (X14-2270-11), IC4 (X29-1930-00): TC4053BP
C^2 CMOS Digital ICs

Pin Configuration

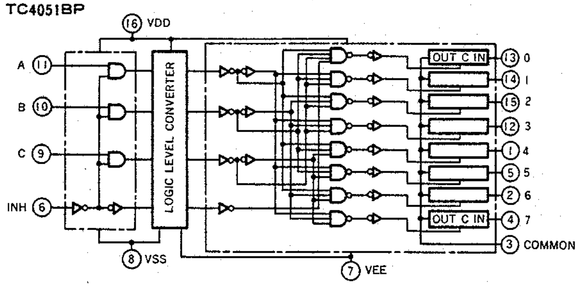
Logic Diagram

TC4051BP

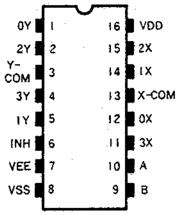

4 1
6 2
COM 3
7 4
5 5
INH 6
VEE 7
VSS 8
16 VDD
15 2
14 1
13 0
12 3
11 A
10 B
9 C

(Top View)

TC4051BP

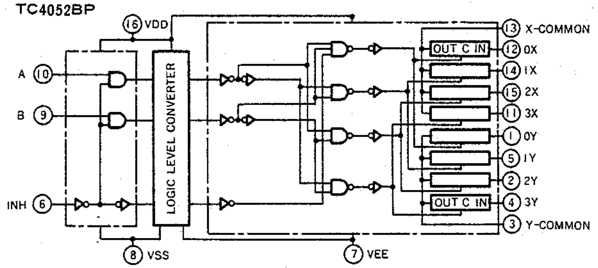

16 VDD
A 11
B 10
C 9
INH 6
LOGIC LEVEL CONVERTER
OUT C IN
13 0
14 1
15 2
12 3
1 4
5 5
2 6
4 7
3 COMMON
8 VSS
7 VEE

TC4052BP

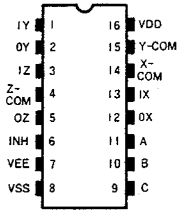

0Y 1
2Y 2
Y-COM 3
3Y 4
1Y 5
INH 6
VEE 7
VSS 8
16 VDD
15 2X
14 1X
13 X-COM
12 0X
11 3X
10 A
9 B

(Top View)

TC4052BP

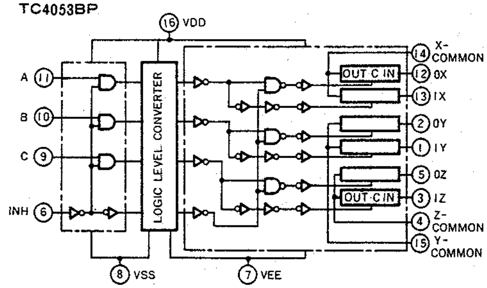

16 VDD
A 10
B 9
INH 6
LOGIC LEVEL CONVERTER
OUT C IN
13 X-COMMON
12 0X
14 1X
15 2X
11 3X
1 0Y
5 1Y
2 2Y
4 3Y
3 Y-COMMON
8 VSS
7 VEE

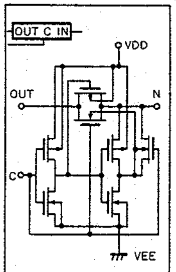
TC4053BP


1Y 1
0Y 2
1Z 3
Z-COM 4
0Z 5
INH 6
VEE 7
VSS 8
16 VDD
15 Y-COM
14 X-COM
13 1X
12 0X
11 A
10 B
9 C

(Top View)

TC4053BP


16 VDD
A 11
B 10
C 9
INH 6
LOGIC LEVEL CONVERTER
OUT C IN
14 X-COMMON
12 0X
13 1X
2 0Y
1 1Y
5 0Z
3 1Z
4 Z-COMMON
15 Y-COMMON
8 VSS
7 VEE

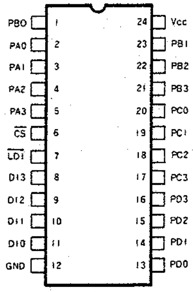

OUT C IN
VDD
OUT
IN
C
VEE

Analog Switch
Mquivalent Circuit

CIRCUIT DESCRIPTION

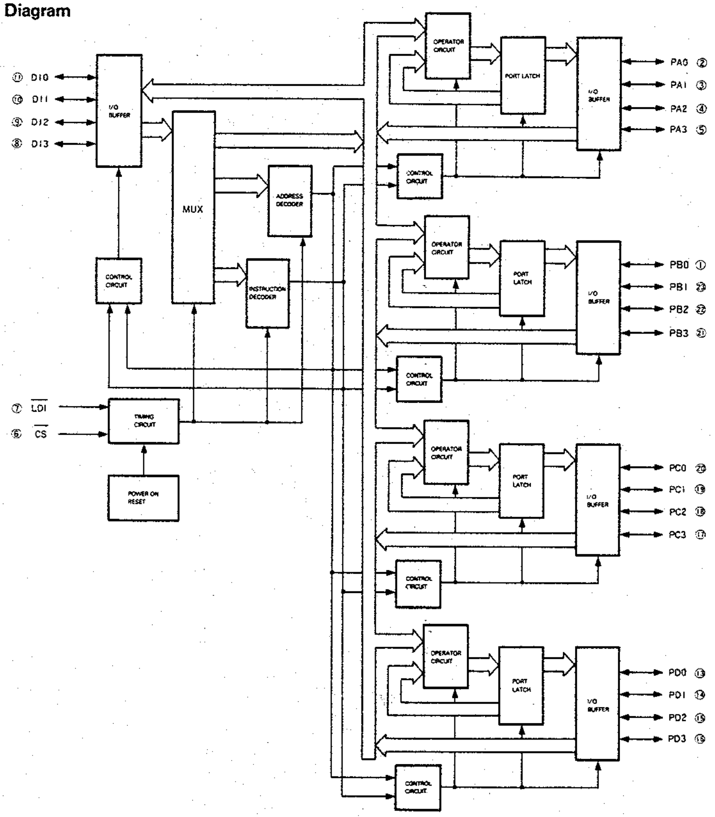
IC4 (X14-2270-11): MB88305
I/O Port Expander IC

Pin Configuration


PB0 1
PA0 2
PA1 3
PA2 4
PA3 5
CS 6
LDI 7
DI3 8
DI2 9
DI1 10
DI0 11
GND 12
24 Vcc
23 PB1
22 PB2
21 PB3
20 PC0
19 PC1
18 PC2
17 PC3
16 PD3
15 PD2
14 PD1
13 PD0

(Top View)

Internal Block Diagram


⑪ DI0
⑩ DI1
⑨ DI2
⑧ DI3
I/O BUFFER
MUX
ADDRESS DECODER
INSTRUCTION DECODER
CONTROL CIRCUIT
⑦ LDI
⑥ CS
TIMING CIRCUIT
POWER ON RESET
OPERATOR CIRCUIT
PORT LATCH
PA0 ②
PA1 ③
PA2 ④
PA3 ⑤
PB0 ①
PB1 ㉓
PB2 ㉒
PB3 ㉑
PC0 ⑳
PC1 ⑲
PC2 ⑱
PC3 ⑰
PD0 ⑬
PD1 ⑭
PD2 ⑮
PD3 ⑯

CIRCUIT DESCRIPTION

Explanation of Pins

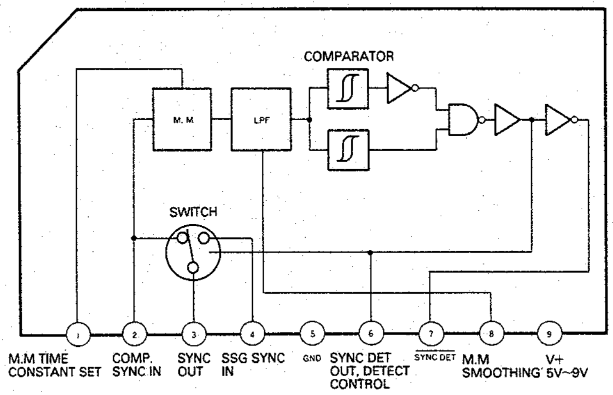
Pin No.	Symbol	Function	Name
6	$\overline{CS}$	Chip Select	Chip select terminal with TTL-compatible, high-impedance input. The chip is selected when the input is at a "L" level.
7	$\overline{LDI}$	Strobe Input	Strobe input terminal. The operation codes and address codes applied to DI0 to DI3 are input at the fall (‾_) of the $\overline{LDI}$ input. The data exchanged via DI0 to DI3 are validated at the rise (_/‾) of the LDI input.
8 | 11	D13 | D10	DI	4-bit bidirectional port for use in interfacing with the MCU. The operation code and address code are validated at the fall of the strobe input ($\overline{LDI}$), and the data is exchanged at the rise of the strobe input. This port is maintained in high impedance except during execution of the input function.
12	GND	Ground	Grounding (GND) terminal.
2 | 5	PA0 | PA3	Port A	4-bit bidirectional input/output (I/O) ports, which are used as the MCU expansion I/O ports. The four 4-bit ports, A, B, C and D, are addressed by data from the MCU. When an input code is received from the MCU, the specified port data is transferred to the MCU via DI0 to DI3. When an output code is received, the data at the interface port (DI0 to DI3) is input, latched and output at the specified port. There is also an instruction for an arithmetic operation with the latched-output data at the port. In this case, the arithmetic operation is executed between the data at DI0 to DI3, which is input at the rise of the strobe input ($\overline{LDI}$), and the data output at the specified port. The result of the operation is latched-output at the specified port. The statuses of ports A to D are all high-impedance after power-on resetting. The high-impedance status of each port is released when any of the OUT, AND or OR functions of the port is used
1 33 | 21	PB0 PB3 | PB1	Port B	
20 | 17	PC0 | PC3	Port C	
16 | 13	PD0 | PD3	Port D	
24	Vcc	Power Supply	+5V power supply terminal

CIRCUIT DESCRIPTION

IC5 (X14-2270-11): NJM2220S

Video Signal Detector IC

Pin Configuration Diagram and Description of Each Block



M.M: Varies the duty ratio of the output signal, according to the input sync signal status (disturbed signal, no signal).

LPF: Converts the M.M output signal into a DC level. The larger the duty ratio, the larger the DC level (voltage at pin 8). (To increase the detection speed, the DC level is clamped at V+/2 + 0.7V.)

Comparator: Outputs the signal presence detection signal, depending on the DC level of the LPF output.
A stable output is obtained because hysteresis is provided.

Switch: Switches the input sync signal and the SSG's sync signal, according to the detection signal from the comparator or to the control signal input from pin 6. The selected signal is output at pin 3 (SYNC OUT).

Explanation of Pins

Pin No.	Function
1	The R and C determining the time constant of M.M are connected. (The time constant varies depending on the type of the sync signal input at pin 2.)
2	The input sinal is the sync signal (COMP SYNC, H.SYNC or V.SYNC) which is separated from the video signal.
3	The signal input to pin 2 or 4 is output depending on the status of the sync signal input at pin 2. When pin 2 input is normal: Pin 2 input signal is output. When pin 2 input is abnormal: Pin 4 input signal is output.
4	The input signal is the sync signal which is artificially generated by the SSG (Sync Signal Generator).
5	GND
6	A H or L level DC voltage is output, depending on the status of the sync signal input at pin 2. By setting the SW to 1, the signal input at pin 2 can be output at pin 3. When pin 2 input is normal: H level When pin 2 input is abnormal: L level
7	A H or L level DC voltage is output depending on the status of the sync signal input at pin 2. When pin 2 input is normal: H level When pin 2 input is abnormal: L level
8	The M.M smoothing capacitor is connected. (The time constant varies depending on the type of signal input at pin 2.) Resistor R, connected externally to pin 1, shall be adjusted so that the initial level is 2 V (V+ = 5V) when the signal is input to pin 2.
9	V+ = 5 ~ 9V

CIRCUIT DESCRIPTION

IC6 (X14-2270-11): MB88323A-K2
Display Controller CMOS LSI

Outline

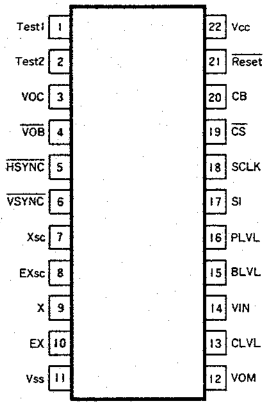
The MB88323A-K2 is a display controller CMOS LSI for use in displaying characters and patterns on a TV display, and is based on microprocessor control.

The number of display characters is 20 columns x 9 lines. The LSI incorporates a character generator ROM for 64 characters, and is capable of displaying alphanumerics and special characters as well as Japanese letters such as Kanji, Hiragana and Katakana. The LSI also incorporates a programmable character generator RAM for 62 characters. By putting character patterns in the RAM, a versatile display is made possible, including a semi-graphics display consisting of linked character patterns, as well as the alphanumerics, special characters, and Japanese Kanji, Hiragana and Katakana letters.

The dot interpolation facility makes it possible to display smooth oblique lines, and the character size can be expanded in 8-bit increments such as 16 x 16 dots.

The display output can be superimposed on the TV video signal or VTR output signal, and the superimposed picture can also be recorded onto a VTR.

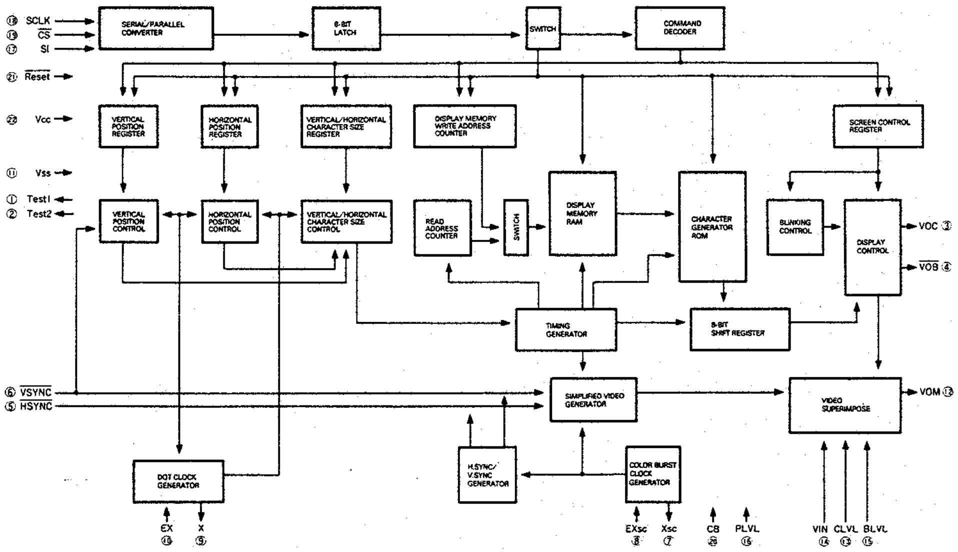
Pin Configuration



Test1 1
Test2 2
VOC 3
VOB 4
HSYNC 5
VSYNC 6
Xsc 7
EXsc 8
X 9
EX 10
Vss 11
22 Vcc
21 Reset
20 CB
19 CS
18 SCLK
17 SI
16 PLVL
15 BLVL
14 VIN
13 CLVL
12 VOM

(Top View)

Internal Block Diagram

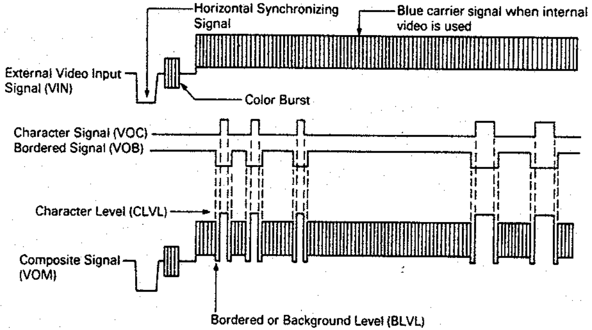


⑱ SCLK
⑲ CS
⑰ SI
㉑ Reset
㉒ Vcc
⑪ Vss
① Test1
② Test2
⑥ VSYNC
⑤ HSYNC
SERIAL/PARALLEL CONVERTER
8-BIT LATCH
SWITCH
COMMAND DECODER
VERTICAL POSITION REGISTER
HORIZONTAL POSITION REGISTER
VERTICAL/HORIZONTAL CHARACTER SIZE REGISTER
DISPLAY MEMORY WRITE ADDRESS COUNTER
SCREEN CONTROL REGISTER
VERTICAL POSITION CONTROL
HORIZONTAL POSITION CONTROL
VERTICAL/HORIZONTAL CHARACTER SIZE CONTROL
READ ADDRESS COUNTER
SWITCH
DISPLAY MEMORY RAM
CHARACTER GENERATOR ROM
BLINKING CONTROL
DISPLAY CONTROL
VOC ③
VOB ④
TIMING GENERATOR
8-BIT SHIFT REGISTER
SIMPLIFIED VIDEO GENERATOR
VIDEO SUPERIMPOSE
VOM ⑫
DOT CLOCK GENERATOR
H.SYNC/ V.SYNC GENERATOR
COLOR BURST CLOCK GENERATOR
EX ⑩
X ⑨
EXsc ⑧
Xsc ⑦
CB ⑳
PLVL ⑯
VIN ⑭
CLVL ⑬
BLVL ⑮

CIRCUIT DESCRIPTION

Explanation of Pins

Pin Name	Pin No.	Input/ Output	Function
EXtal Xtal	10 9	Input Output	Terminals for connecting the external dot clock generator
$\overline{\text{Reset}}$	21	Input	TVDC reset input terminal. The TVDC operation is initialized when $\overline{\text{Reset}}$ is at a "Low" level. When power is turned ON, the V sync signal must be input to the VSYNC terminal. This is a hysteresis input.
$\overline{\text{HSYNC}}$	5	Input	Horizontal sync signal input terminal. A hysteresis input.
$\overline{\text{VSYNC}}$	6	Input	Vertical sync signal input terminal. A hysteresis input.
CS	19	Input	Chip Select terminal, which is set to a "Low" level when a serial transfer is required. A hysteresis input.
SCLK	18	Input	Serial clock input terminal, for use in a serial transfer. A hysteresis input.
SI	17	Input	Display control data input terminal. A hysteresis input.
VIN	14	Input	Video signal input terminal. (Analog input)
CLVL	13	Input	Character level input terminal. (Analog input)
BLVL	15	Input	Edge and background level input terminal. (Analog input)
VOM	12	Output	Output terminal for the superimposed signal of the video signal, character signal and edge or background signal. (Analog output).
VOC	3	Output	Character signal output terminal.
$\overline{\text{VOB}}$	4	Output	Edge or background signal output terminal.
EXsc Xsc	8 7	Input Output	Terminals for connecting the external color burst clock generator (7.15909 MHz or 14.31818 MHz). Also used for the internal sync signal generation in Video mode 2.
CB	20	Input	Used to select whether the color burst is to be present or not when Video mode 2 is set.
PLVL	16	Input	Pedestal level input terminal. When Video mode 2 is set, the pedestal level of the internally-generated simplified video signal shall be adjusted to that of the external video signal.
Vcc	22	Input	+5V external power supply terminal.
Vss	11	Input	GND.
Test 1 Test 2	1 2	Output	Chip testing terminals, which are usually open.



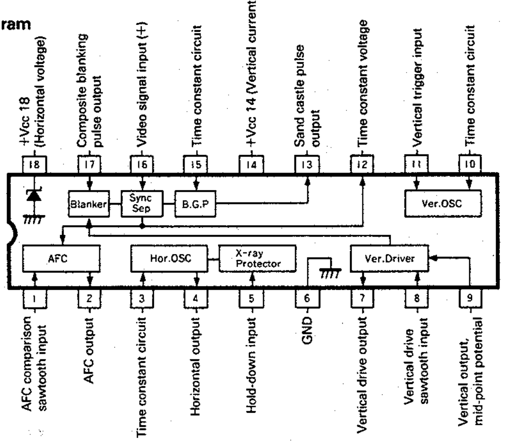
Horizontal Synchronizing Signal
Blue carrier signal when internal video is used
External Video Input Signal (VIN)
Color Burst
Character Signal (VOC)
Bordered Signal (VOB)
Character Level (CLVL)
Composite Signal (VOM)
Bordered or Background Level (BLVL)

CIRCUIT DESCRIPTION

IC7 (X14-2270-11): LA7820

Color TV Sync/Deflection Circuit IC

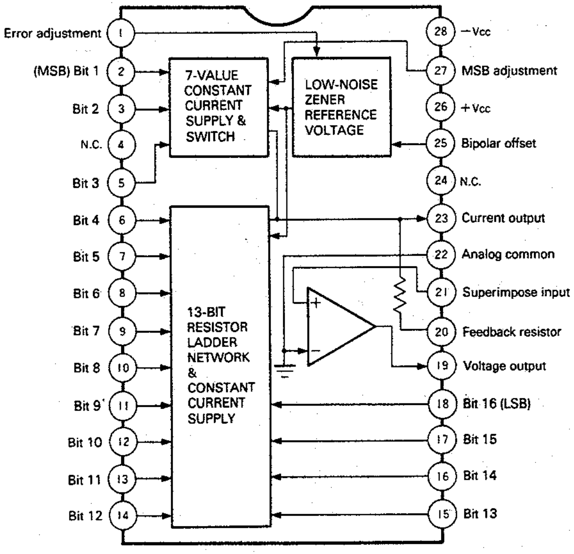
Equivalent Circuit Block Diagram


+Vcc 18 (Horizontal voltage)
Composite blanking pulse output
Video signal input (+)
Time constant circuit
+Vcc 14 (Vertical current)
Sand castle pulse output
Time constant voltage
Vertical trigger input
Time constant circuit
18
17
16
15
14
13
12
11
10
Blanker
Sync Sep
B.G.P
Ver.OSC
AFC
Hor.OSC
X-ray Protector
Ver.Driver
1
2
3
4
5
6
7
8
9
AFC comparison sawtooth input
AFC output
Time constant circuit
Horizontal output
Hold-down input
GND
Vertical drive output
Vertical drive sawtooth input
Vertical output, mid-point potential

IC13 (X14-2270-11): PCN54HP

D/A Converter IC

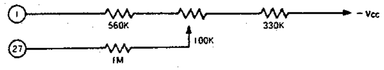
Pin Configuration and Internal Block Diagram


Error adjustment 1
(MSB) Bit 1 2
Bit 2 3
N.C. 4
Bit 3 5
Bit 4 6
Bit 5 7
Bit 6 8
Bit 7 9
Bit 8 10
Bit 9 11
Bit 10 12
Bit 11 13
Bit 12 14
7-VALUE CONSTANT CURRENT SUPPLY & SWITCH
LOW-NOISE ZENER REFERENCE VOLTAGE
13-BIT RESISTOR LADDER NETWORK & CONSTANT CURRENT SUPPLY
28 –Vcc
27 MSB adjustment
26 +Vcc
25 Bipolar offset
24 N.C.
23 Current output
22 Analog common
21 Superimpose input
20 Feedback resistor
19 Voltage output
18 Bit 16 (LSB)
17 Bit 15
16 Bit 14
15 Bit 13

Notes:

1) Output noise can be reduced by a capacitance connected to pin 1.
Cutoff frequency Fc is equal to 1/2 C·500 (Hz).

2) The MSB error and bipolar zero differential linearity error can be adjusted to zero by using the external circuit shown below.

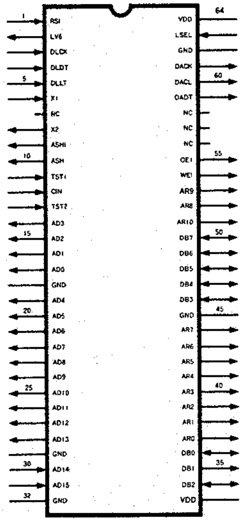

1
560K
100K
330K
–Vcc
27
1M

CIRCUIT DESCRIPTION

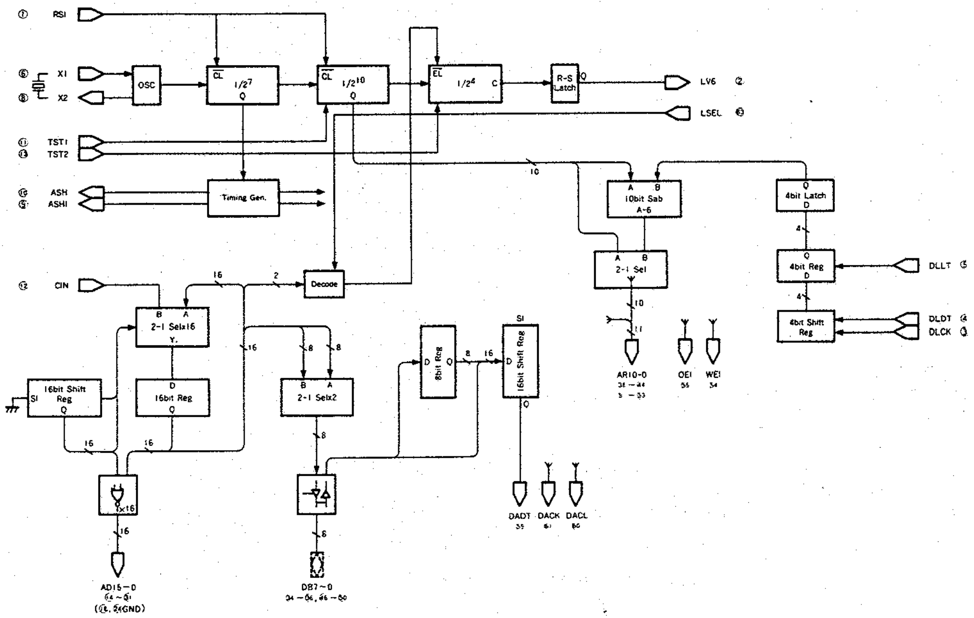
IC14 (X14-2270-11): μPD65012CW-220

Digital Delay Gate Array IC

Pin Configuration


1
RSI
LV6
DLCK
DLDT
5
DLLT
X1
NC
X2
ASHI
10
ASH
TST1
CIN
TST2
AD3
15
AD2
AD1
AD0
GND
AD4
20
AD5
AD6
AD7
AD8
AD9
25
AD10
AD11
AD12
AD13
GND
30
AD14
AD15
32
GND
64
VDD
LSEL
GND
DACK
60
DACL
DADT
NC
NC
NC
55
OE1
WE1
AR9
AR8
AR10
50
DB7
DB6
DB5
DB4
DB3
45
GND
AR7
AR6
AR5
AR4
40
AR3
AR2
AR1
AR0
DB0
35
DB1
DB2
VDD

Internal Block Diagram


RSI
X1
X2
OSC
1/2⁷
1/2¹⁰
1/2⁴
R-S Latch
LV6
LSEL
TST1
TST2
ASH
ASHI
Timing Gen.
CIN
Decode
10bit Sab
4bit Latch
2-1 Sel
4bit Reg
4bit Shift Reg
DLLT
DLDT
DLCK
2-1 Selx16
16bit Shift Reg
16bit Reg
2-1 Selx2
8bit Reg
16bit Shift Reg
AR10~0
OE1
WE1
DADT
DACK
DACL
AD15~0
DB7~0

CIRCUIT DESCRIPTION

Explanation of Pins

Pin No.	Pin Name	I/O	Function
1	RSI	I	Reset input. Resetting occurs when RSI = "0".
2	RSI	I	Level output. When LESL = "0", LV6 goes to "0" for about 0.5 sec if the level of the A/D converted data is more than −6 dB. When LESL = "1", LV6 goes to "0" if the data level is more than −12 dB.
3	DLCK	I	Delay value set data read clock. Data is latched at the rise of the clock.
4	DLDT	I	Delay value set data input terminal.
5	DLLT	I	Delay value set data latch input. Data is latched at the fall, the 4 bits before the fall become the set data.
6	X1		X'tal (128 fs = 4.352 MHz) connection terminal, or the external clock input terminal.
7	NC	O	No connection.
8	X2	O	X'tal connection terminal. When an external clock is connected to X1, X2 shall be set to open.
9	ASHI	O	Sample & hold control terminal. Inverted ASH output.
10	ASH	O	Sample & hold control terminal. Hold when ASH = "0", sample when ASH = "1".
11	TST1	I	IC test terminal. Normally, TST1 = "0", or open.
12	CIN	I	Comparator signal input terminal for sequential comparison A/D conversion. When CIN = "1", the bit goes to "1".
13	TST2	I	IC test terminal. Normally, TST2 = "0", or open.
14	AD3	O	Sequential A/D conversion data. Data output terminal to the D/A converter. The 4th bit counte from the LSB.
15	AD2	O	Sequential A/D conversion data. Data output terminal to the D/A converter. The 3rd bit counte from the LSB.
16	AD1	O	Sequential A/D conversion data. Data output terminal to the D/A converter. The 2nd bit counte from the LSB.
17	AD0	O	Sequential A/D conversion data. Data output terminal to the D/A converter. The LSB.
18	GND		GND. 0V.
19	AD4	O	A/D conversion data. Data output terminal to the D/A converter.
20	AD5	O	A/D conversion data. Data output terminal to the D/A converter.
21	AD6	O	A/D conversion data. Data output terminal to the D/A converter.
22	AD7	O	A/D conversion data. Data output terminal to the D/A converter.
23	AD8	O	A/D conversion data. Data output terminal to the D/A converter.
24	AD9	O	A/D conversion data. Data output terminal to the D/A converter.
25	AD10	O	A/D conversion data. Data output terminal to the D/A converter.
26	AD11	O	A/D conversion data. Data output terminal to the D/A converter.
27	AD12	O	A/D conversion data. Data output terminal to the D/A converter.
28	AD13	O	A/D conversion data. Data output terminal to the D/A converter.
29	GND		GND. 0V.
30	AD14	O	A/D conversion data. Data output terminal to the D/A converter.
31	AD15	O	A/D conversion data. Data output terminal to the D/A converter. The MSB. The output data is Complementary Offset Binary data. MSB LSB 0 0 …… 0 0 + Full scale 0 1 …… 1 1 0 1 0 …… 0 0 −1LSB 1 1 …… 1 1 −Full scale
32	GND		GND. 0V.

CIRCUIT DESCRIPTION

Pin No.	Pin Name	I/O	Function
33	VDD		VDD. +5V.
34	DB2	I/O	RAM data input/output terminal (1 bit of 8-bit parallel data).
35	DB1	I/O	RAM data input/output terminal (1 bit of 8-bit parallel data).
36	DB0	I/O	RAM data input/output terminal (1 bit of 8-bit parallel data).
37	AR0	O	RAM address output. LSB. (1 bit of 11-bit parallel data).
38	AR1	O	RAM address output.
39	AR2	O	RAM address output.
40	AR3	O	RAM address output.
41	AR4	O	RAM address output.
42	AR5	O	RAM address output.
43	AR6	O	RAM address output.
44	AR7	O	RAM address output.
45	GND		GND. 0V.
46	DB3	I/O	RAM data input/output terminal.
47	DB4	I/O	RAM data input/output terminal.
48	DB5	I/O	RAM data input/output terminal.
49	DB6	I/O	RAM data input/output terminal.
50	DB7	I/O	RAM data input/output terminal.
51	AR10	O	RAM address output. MSB.
52	AR8	O	RAM address output.
53	AR9	O	RAM address output.
54	WEI	O	RAM WE control terminal. Data writing to RAM is enabled when WEI = "0".
55	OEI	O	RAM OE control terminal. Data reading from RAM is enabled when OEI = "0".
56 | 58	NC		No connection.
59	DADT	O	Serial output data to the D/A converter. 2's complement. From MSB.
60	DACL	O	D/A converter latch control terminal. fs.
61	DACK	O	D/A converter serial data shift clock. 64 fs.
62	GND		GND. 0V.
63	LSEL	I	Level selection of the level output LV6.
64	VDD		VDD. +5V.

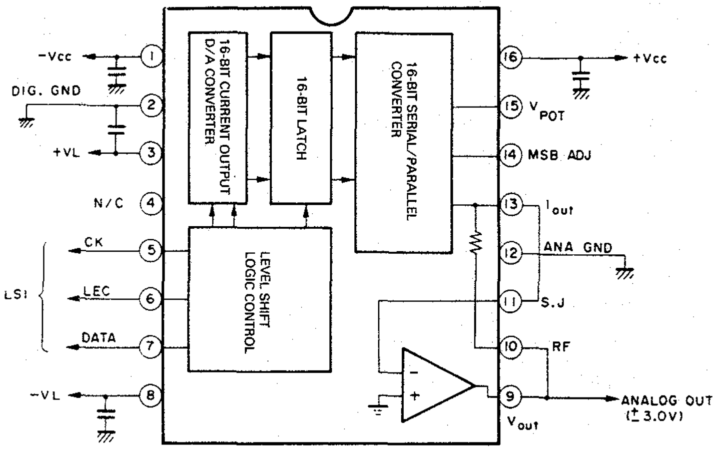
CIRCUIT DESCRIPTION

IC15 (X14-2270-11): PCM56P

Outline of the D/A Unit Operation

The D/A converter is the same as PCM56P of IC1 and IC2 (same as the D-3300A, except that the ranking is different). The pin configuration and block diagram are shown in Fig. 1 and Fig. 2, and the timing diagram is shown in Fig. 3.

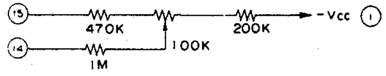
Block Diagram and Pin Configuration



-Vcc
DIG. GND
+VL
N/C
CK
LEC
DATA
LSI
-VL
16-BIT CURRENT OUTPUT D/A CONVERTER
16-BIT LATCH
16-BIT SERIAL/PARALLEL CONVERTER
LEVEL SHIFT LOGIC CONTROL
+Vcc
V POT
MSB ADJ
I out
ANA GND
S.J
RF
ANALOG OUT (± 3.0V)
V out
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

Fig. 1

Note: The MSB error and bipolar zero differential linearity error can be adjusted to zero by using the external circuit shown below.



15
14
470K
1M
100K
200K
-Vcc
1

Fig. 2

Explanation of Pins

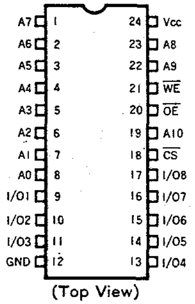
Pin No.	Pin Name	Function	Pin No.	Pin Name	Function
1	-Vcc	Analog negative power supply.	9	Vout	Voltage output.
2	DIG GND	Digital ground.	10	RF	Feedback resistance.
3	+VL	Logic positive power supply.	11	SJ	Summing junction (opamp input).
4	NC	No connection.	12	ANA GND	Analog ground.
5	CK	Clock input.	13	Iout	Current output.
6	LEC	Latch enable control input.	14	MSB ADJ	MSB adjustment terminal.
7	DATA	Data input.	15	VPOT	Potentiometer terminal.
8	-VL	Logic negative power supply.	16	+Vcc	Analog positive power supply.

CIRCUIT DESCRIPTION

IC16 (X14-2270-11): TMM2115BP-15

2.048-word x 8-bit Static RAM

Pin Configuration

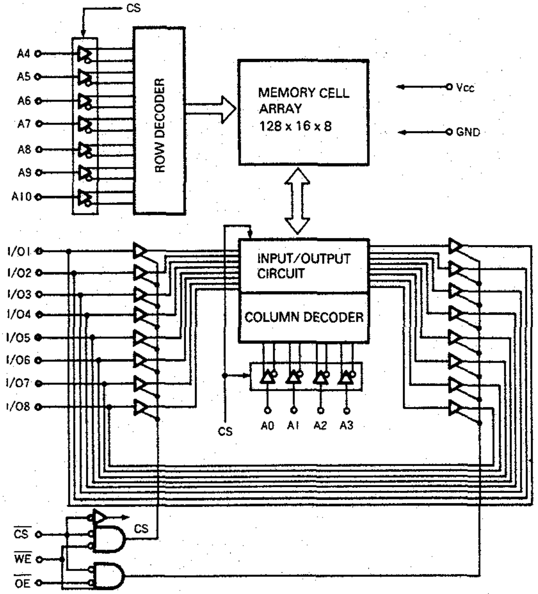


A7 1
A6 2
A5 3
A4 4
A3 5
A2 6
A1 7
A0 8
I/O1 9
I/O2 10
I/O3 11
GND 12
24 Vcc
23 A8
22 A9
21 WE
20 OE
19 A10
18 CS
17 I/O8
16 I/O7
15 I/O6
14 I/O5
13 I/O4
(Top View)

Pin Name

Symbol	Name
A0 ~ A10	Address inputs.
I/O1 ~ I/O8	Data inputs/outputs.
CS	Chip Select input.
WE	Write Enable input.
OE	Output buffer control input.
Vcc	Power supply (5 V) terminal.
GND	Ground.

Internal Block Diagram



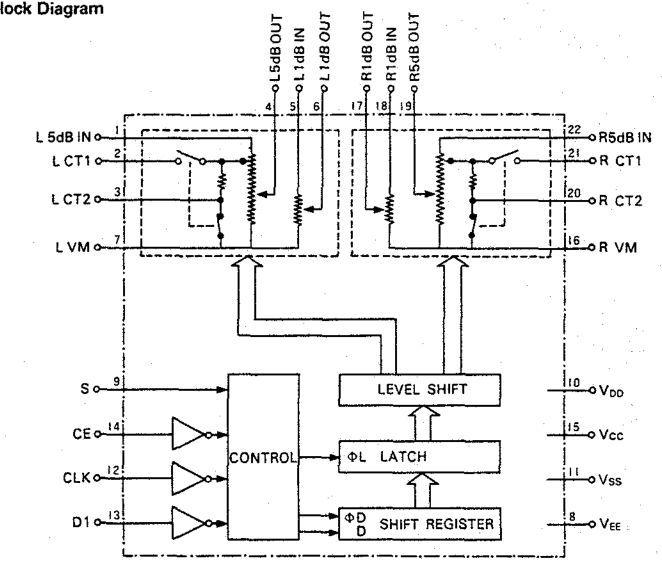
CS
A4
A5
A6
A7
A8
A9
A10
ROW DECODER
MEMORY CELL ARRAY 128 x 16 x 8
Vcc
GND
I/O1
I/O2
I/O3
I/O4
I/O5
I/O6
I/O7
I/O8
INPUT/OUTPUT CIRCUIT
COLUMN DECODER
CS
A0
A1
A2
A3
CS
WE
OE
CS

CIRCUIT DESCRIPTION

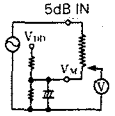
IC23 (X14-2270-11): LC7535

Electronic VR Balance IC

Equivalent Circuit Block Diagram


L5dB OUT
L1dB IN
L1dB OUT
R1dB OUT
R1dB IN
R5dB OUT
4
5
6
17
18
19
L 5dB IN 1
L CT1 2
L CT2 3
L VM 7
22 R5dB IN
21 R CT1
20 R CT2
16 R VM
S 9
CE 14
CLK 12
D1 13
LEVEL SHIFT
CONTROL
ΦL LATCH
ΦD D SHIFT REGISTER
10 V_DD
15 Vcc
11 Vss
8 V_EE

Explanation of Pins

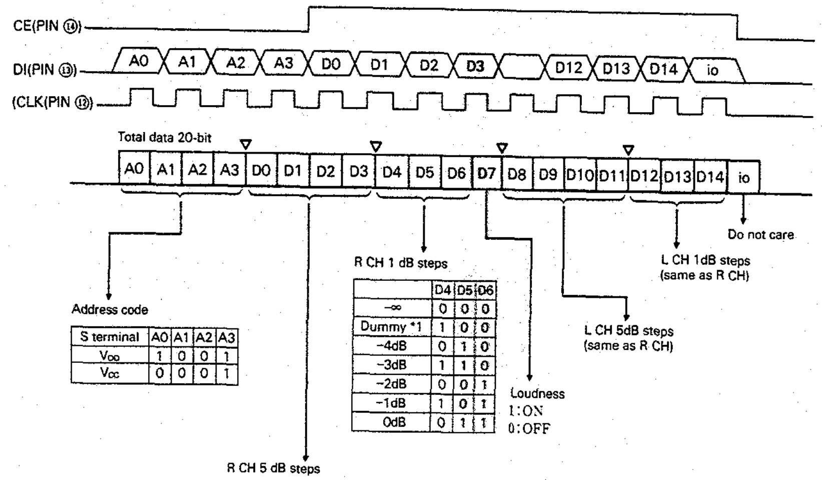
Pin No.	Symbol	I/O	Function	Remark
1	L5dB IN	I	5 dB step attenuator input terminal. Should be driven by a low impedance.	Total resistance 75 k-ohms
22	R5dB IN			
2	LCT1		Loudness control terminals. The high-frequency compensation capacitors are connected between CT1 and 5dBIN, and the low-frequency compensation capacitors are connected between CT2 and VM.	
3	LCT2			
21	RCT1			
20	RCT2			
4	L5dB OUT	O	5 dB step attenuator output terminals. A load of about 1 M-ohm is required for each terminal.	
19	R5dB OUT			
5	L1dB IN	I	1 dB step attenuator input terminals. Should be driven by a low impedance.	Total resistance 20 k-ohms.
18	R1dB IN			
6	L1dB OUT	O	1 dB step attenuator output terminals. A load of 47 k-ohms to 1 M-ohm is required.	
17	R1dB OUT			
7	L VM		VR common terminals. The impedance of the pattern connected to each terminal should be as low as possible. As L VM, R VM and Vss are not connected internally, they shall be connected externally considering the specifications. Specially, in the case of a single power supply, each capacitor between VM and Vss becomes the residual resistance component when the VR setting is minimized, so it is required that special care be taken for the capacitor's capacitance.	 5dB IN V_DD V_M
16	R VM			
9	S		Select terminal for the address code in the data format. When this terminal is connected to V_{DD}, data is accepted if the address code is "9". When it is connected to V_{CC}, data is accepted if the address code is "8".	

CIRCUIT DESCRIPTION

Explanation of Pins

Pin No.	Symbol	I/O	Function	Remark
12	CLK	I	Input terminals for controlling LC7535 using serial data. The input amplitude is 0 to 5 V. When any (CLK, DI or CE) of the control microprocessor signals is "H" in the backup status ($V_{DD} = V_{CC} = 0V$), insert a resistor of 2 k-ohms or more in series in the middle of the signal line.	
13	DI			
14	CE			
8	V_{EE}		Power supply connection terminals. Take care so that V_{DD} does not rise before V_{CC} when power is turned ON.	
10	V_{DD}			
11	V_{SS}			
15	V_{CC}			

Data Format


CE(PIN ⑭)
DI(PIN ⑬)
(CLK(PIN ⑫)
A0
A1
A2
A3
D0
D1
D2
D3
D12
D13
D14
io
Total data 20-bit
A0 A1 A2 A3 D0 D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 io
Do not care
L CH 1dB steps (same as R CH)
L CH 5dB steps (same as R CH)
R CH 1 dB steps
Loudness 1:ON 0:OFF
Address code
R CH 5 dB steps

Address code

S terminal	A0	A1	A2	A3
V_{DD}	1	0	0	1
V_{CC}	0	0	0	1

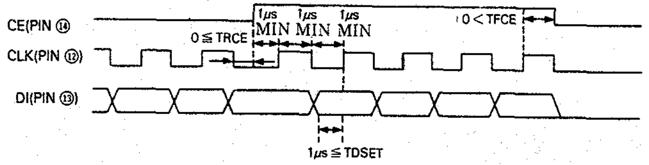
R CH 1 dB steps

	D4	D5	D6
−∞	0	0	0
Dummy *1	1	0	0
−4dB	0	1	0
−3dB	1	1	0
−2dB	0	0	1
−1dB	1	0	1
0dB	0	1	1

Loudness
1:ON
0:OFF

R CH 5 dB steps

	D0	D1	D2	D3
−75dB	0	0	C	0
−70dB	1	0	0	0
−65dB	0	1	0	0
−60dB	1	1	0	0
−55dB	0	0	1	0
−50dB	1	0	1	0
−45dB	0	1	1	0
−40dB	1	1	1	0
−35dB	0	0	0	1
−30dB	1	0	0	1
−25dB	0	1	0	1
−20dB	1	1	0	1
−15dB	0	0	1	1
−10dB	1	0	1	1
− 5dB	0	1	1	1
− 0dB	1	1	1	1

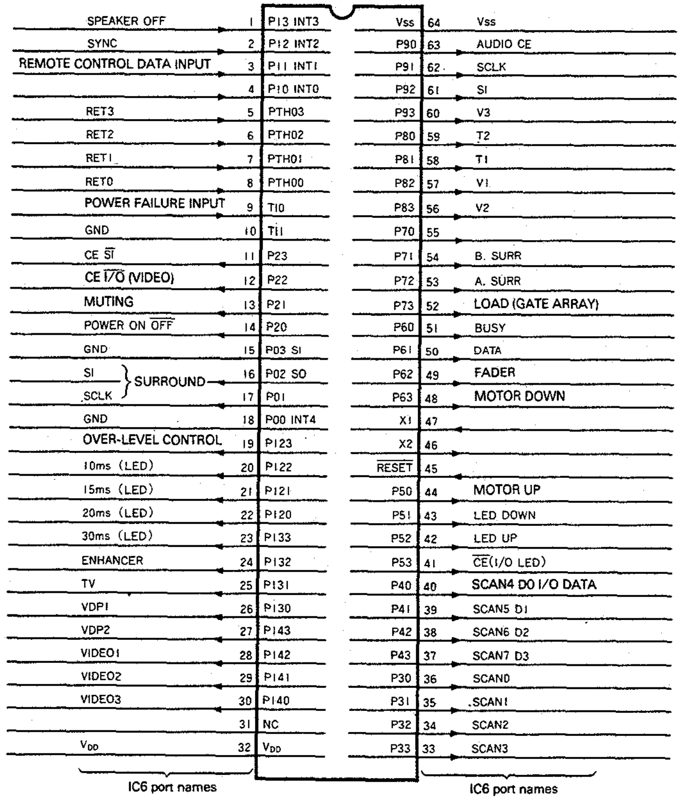

CE(PIN ⑭
CLK(PIN ⑫)
DI(PIN ⑬)
1μs MIN
1μs MIN
1μs MIN
0 ≦ TRCE
0 < TFCE
1μs ≦ TDSET

CIRCUIT DESCRIPTION

IC 6 (X29-1930-00): μPD75106CW-076

Microprocessor

Pin Configuration and I/O Assignment


SPEAKER OFF
SYNC
REMOTE CONTROL DATA INPUT
RET3
RET2
RET1
RET0
POWER FAILURE INPUT
GND
CE SI
CE I/O (VIDEO)
MUTING
POWER ON OFF
GND
SI
SCLK
SURROUND
GND
OVER-LEVEL CONTROL
10ms (LED)
15ms (LED)
20ms (LED)
30ms (LED)
ENHANCER
TV
VDP1
VDP2
VIDEO1
VIDEO2
VIDEO3
VDD
1 P13 INT3
2 P12 INT2
3 P11 INT1
4 P10 INT0
5 PTH03
6 PTH02
7 PTH01
8 PTH00
9 TI0
10 TI1
11 P23
12 P22
13 P21
14 P20
15 P03 SI
16 P02 SO
17 P01
18 P00 INT4
19 P123
20 P122
21 P121
22 P120
23 P133
24 P132
25 P131
26 P130
27 P143
28 P142
29 P141
30 P140
31 NC
32 VDD
Vss 64
P90 63
P91 62
P92 61
P93 60
P80 59
P81 58
P82 57
P83 56
P70 55
P71 54
P72 53
P73 52
P60 51
P61 50
P62 49
P63 48
X1 47
X2 46
RESET 45
P50 44
P51 43
P52 42
P53 41
P40 40
P41 39
P42 38
P43 37
P30 36
P31 35
P32 34
P33 33
Vss
AUDIO CE
SCLK
SI
V3
T2
T1
V1
V2
B. SURR
A. SURR
LOAD (GATE ARRAY)
BUSY
DATA
FADER
MOTOR DOWN
MOTOR UP
LED DOWN
LED UP
CE(I/O LED)
SCAN4 D0 I/O DATA
SCAN5 D1
SCAN6 D2
SCAN7 D3
SCAN0
SCAN1
SCAN2
SCAN3
IC6 port names
IC6 port names

Explanation of Pins

Pin No.	Pin Symbol	I/O	Name	Function
1	P13	I	SPEAKER OFF	Applies muting when the main amp protection circuit operation signal is input.
2	P12	I	SYNC	A blue background is displayed when the video sync error signal is input.
3	P11	I	Remote control input	Data input from the remote-control receptor.
5 ~ 8	PTH03 ~ 00	I	RET3 ~ RET0	Key return signal input.
9	TI0	I	Power failure input	Power failure signal input. Detected when the level is Low. The backup status is activated when power from the outlet is OFF.
10	TI1			GND.
11	P23	O	CESI	CE for the superimpose IC.
12	P22	O	CEI/O	CE for the Video Control Unit I/O EXP.
13	P21	O	Muting	Muting signal output.
14	P20	O	POWER ON/OFF	Power ON/OFF signal. Power relay OFF. SW 5 V OFF.

CIRCUIT DESCRIPTION

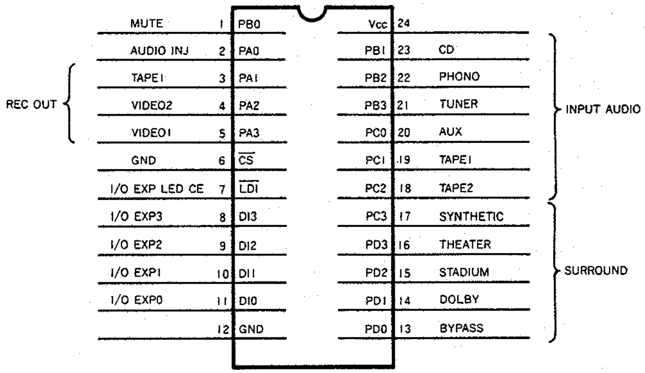
<table>
<tr><th>Pin No.</th><th>Pin Symbol</th><th>I/O</th><th>Name</th><th>Function</th></tr>
<tr><td>15</td><td>P03</td><td></td><td></td><td>GND.</td></tr>
<tr><td>16, 17</td><td>P02, 01</td><td>O</td><td>SO, SCLK</td><td>Gate array (delay time) setting data and clock.</td></tr>
<tr><td>18</td><td>INT4</td><td></td><td></td><td>GND.</td></tr>
<tr><td>19</td><td>P123</td><td>O</td><td>Over-level control</td><td>Controls the over-level LED.
The LED will not light in BYPASS or STADIUM modes.</td></tr>
<tr><td>20 ~ 23</td><td>P122 ~ P133</td><td>O</td><td>10ms ~ 30ms</td><td>Delay time LEDs. Active Low.</td></tr>
<tr><td>24</td><td>P132</td><td>O</td><td>ENHANCER</td><td>Enhance LED. Active Low.</td></tr>
<tr><td>25 ~ 30</td><td>P131, P130
P143 ~ P140</td><td>O</td><td></td><td>Vide input selector LEDs. Active High.</td></tr>
<tr><td>31</td><td></td><td></td><td></td><td>NC.</td></tr>
<tr><td>32</td><td>V_{DD}</td><td></td><td>V_{DD}</td><td></td></tr>
<tr><td>33 ~ 36</td><td>P33 ~ P30</td><td>O</td><td>SCAN 3 ~ 0</td><td>Key scanning terminals. SCAN 0 to 3.</td></tr>
<tr><td>37 ~ 40</td><td>P43 ~ P40</td><td>O</td><td>SCAN 7 ~ 4
D0 ~ D3</td><td>Key scanning terminals. SCAN4 to 7, and data of two I/O EXPs.</td></tr>
<tr><td>41</td><td>P53</td><td>O</td><td>CE</td><td>CE signal for I/O EXP in X29.</td></tr>
<tr><td>42, 43</td><td>P52, 51</td><td>O</td><td>DOWN
LED UP</td><td>Rear VR LEDs. UP and DOWN. Active Low.</td></tr>
<tr><td>44</td><td>P50</td><td>O</td><td>Motor UP</td><td>Motor VR UP control.</td></tr>
<tr><td>45</td><td>RESET</td><td>I</td><td>RESET</td><td>Microprocessor reset signal input. The input is Low when the backup mode is released.</td></tr>
<tr><td>46, 47</td><td>X2, X1</td><td>I, O</td><td></td><td>Ceramic model.</td></tr>
<tr><td>48</td><td>P63</td><td>O</td><td>Motor DOWN</td><td>Motor VR. DOWN control.</td></tr>
<tr><td>49</td><td>P62</td><td>O</td><td>Fader</td><td>Motor VR. Fader control. Active High.</td></tr>
<tr><td>50, 51</td><td>P61, 60</td><td>O</td><td>DATA, BUSY</td><td>Serial communication data and BUSY signal.</td></tr>
<tr><td>52</td><td>P73</td><td>O</td><td>LOAD</td><td>Gate array. Delay time latch signal.</td></tr>
<tr><td>53, 54</td><td>P72, 71</td><td>O</td><td>B. SURR
A. SURR</td><td>Surround mode setting signal.
<table>
<tr><th>A.SURR</th><th>B.SURR</th><th>Surround Mode</th></tr>
<tr><td>0</td><td>0</td><td>BYPASS</td></tr>
<tr><td>0</td><td>1</td><td>DOLBY</td></tr>
<tr><td>1</td><td>0</td><td>THEATER</td></tr>
<tr><td>1</td><td>0</td><td>SYNTHETIC *1</td></tr>
<tr><td>1</td><td>1</td><td>STADIUM</td></tr>
</table>
*1 With SYNTHETIC, the SYNTHETIC LED signal is also used.</td></tr>
<tr><td>56 ~ 60</td><td>P83 ~ P80
P93, P92</td><td>O</td><td></td><td>REC OFF signals for V1, V2, V3, T1 and T2.</td></tr>
<tr><td>61, 62</td><td>P92, 91</td><td>O</td><td>SI, SCLK</td><td>AUDIO SW serial data and serial clock signal.</td></tr>
<tr><td>63</td><td>P90</td><td>O</td><td>AUDIO CE</td><td>AUDIO SW. Rear VR. CE signal.</td></tr>
<tr><td>64</td><td>Vss</td><td></td><td></td><td></td></tr>
</table>

CIRCUIT DESCRIPTION

IC7 (X29-1930-00): MB88304-P

I/O Port Expander IC

Pin Configuration


MUTE 1 PB0
AUDIO INJ 2 PA0
TAPE1 3 PA1
VIDEO2 4 PA2
VIDEO1 5 PA3
REC OUT
GND 6 $\overline{CS}$
I/O EXP LED CE 7 $\overline{LDI}$
I/O EXP3 8 DI3
I/O EXP2 9 DI2
I/O EXP1 10 DI1
I/O EXP0 11 DI0
12 GND
Vcc 24
PB1 23 CD
PB2 22 PHONO
PB3 21 TUNER
PC0 20 AUX
PC1 19 TAPE1
PC2 18 TAPE2
INPUT AUDIO
PC3 17 SYNTHETIC
PD3 16 THEATER
PD2 15 STADIUM
PD1 14 DOLBY
PD0 13 BYPASS
SURROUND

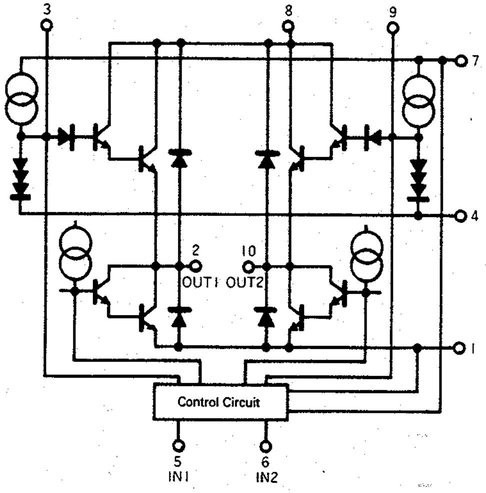
Internal Block Diagram and Explanation of Pins are the same as for MB88305: IC4 (X14-2270-00). Please refer to it's description (on page 00 of this manual).

CIRCUIT DESCRIPTION

IC8 (X29-1930-00): BA6229

Reversible Motor Driver IC

Internal Block Diagram


3
8
9
7
4
2
10
OUT1
OUT2
1
Control Circuit
5
IN1
6
IN2

Truth Table

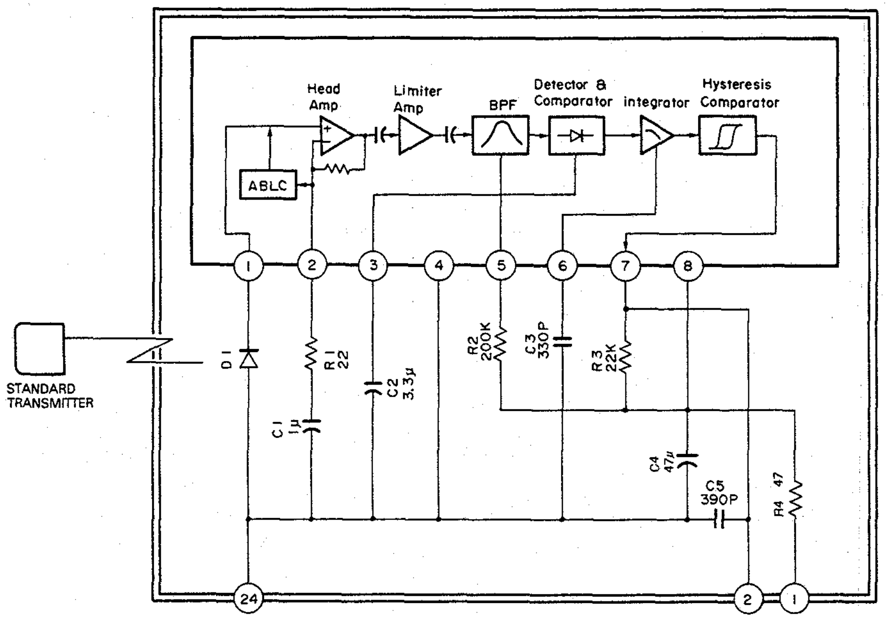
Input		Output		Remark
IN1	IN2	OUT1	OUT2	
L	L	OPEN	OPEN	Stop
H	L	H	L	Forward
L	H	L	H	Reverse
H	H	L	L	Braking

CIRCUIT DESCRIPTION

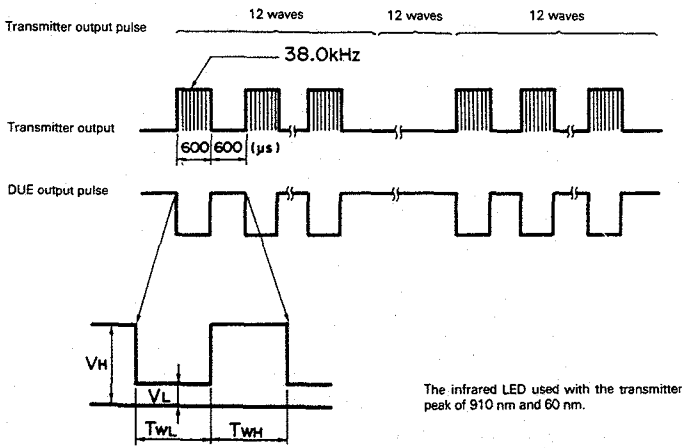
A1: W02-0776-05 (X29-1930-00)

Remote Control Infrared Ray Reception Module

Block Diagram


Head Amp
Limiter Amp
BPF
Detector & Comparator
integrator
Hysteresis Comparator
ABLC
1
2
3
4
5
6
7
8
D1
R1 22
C1 1μ
C2 3.3μ
R2 200K
C3 330P
R3 22K
C4 47μ
C5 390P
R4 47
24
2
1
STANDARD TRANSMITTER

Received Pulse Waveforms

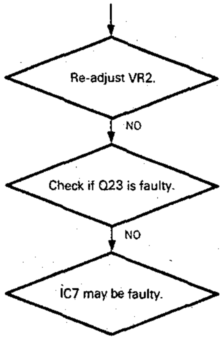

12 waves
12 waves
12 waves
Transmitter output pulse
38.0kHz
Transmitter output
600 600 (μs)
DUE output pulse
VH
VL
TWL
TWH

The infrared LED used with the transmitter shall have a peak of 910 nm and 60 nm.

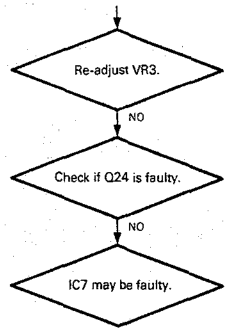
TROUBLESHOOTING

Superimposition Problems and Their Countermeasures

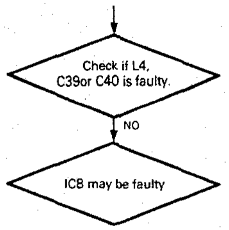
a) The superimposed picture drifts up or down.


Re-adjust VR2.
NO
Check if Q23 is faulty.
NO
IC7 may be faulty.

b) The superimposed picture drifts to the left or right.

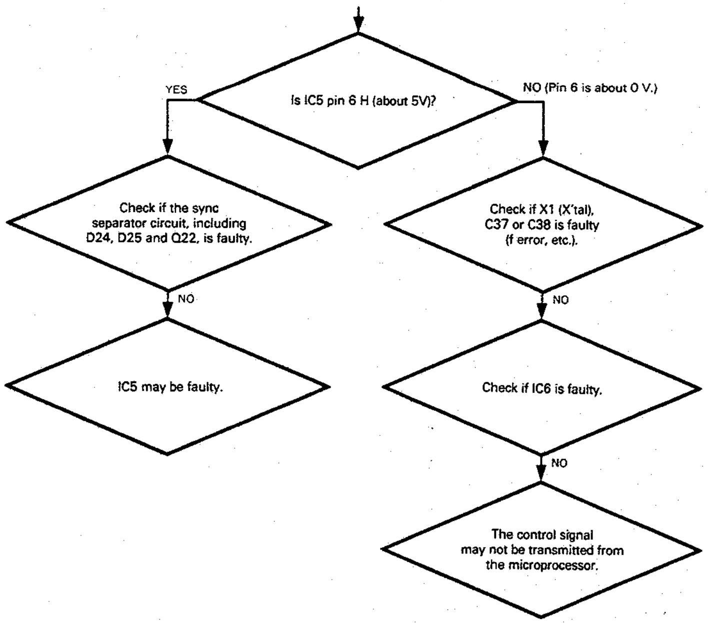

Re-adjust VR3.
NO
Check if Q24 is faulty.
NO
IC7 may be faulty.

c) The superimposed characters are extended or compressed to the left or right.

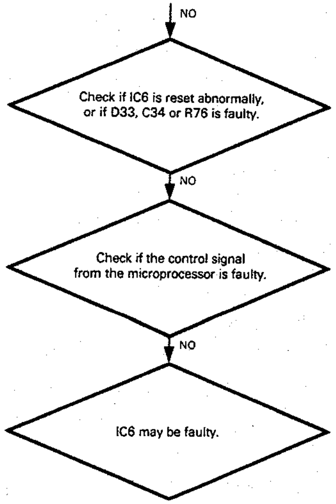

Check if L4, C39or C40 is faulty.
NO
IC8 may be faulty

TROUBLESHOOTING

d) The blue back ground is not displayed although there is no video input (the noise picture is displayed).


Is IC5 pin 6 H (about 5V)?
YES
NO (Pin 6 is about 0 V.)
Check if the sync separator circuit, including D24, D25 and Q22, is faulty.
Check if X1 (X'tal), C37 or C38 is faulty (f error, etc.).
NO
NO
IC5 may be faulty.
Check if IC6 is faulty.
NO
The control signal may not be transmitted from the microprocessor.

e) Abnormal characters are displayed when power is turned ON, the display position is abnormal, or the superimposed characters are not displayed at all.

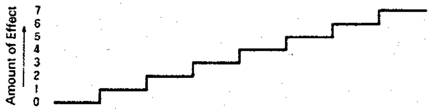

NO
Check if IC6 is reset abnormally, or if D33, C34 or R76 is faulty.
NO
Check if the control signal from the microprocessor is faulty.
NO
IC6 may be faulty.

FAULT DIAGNOSTICS

1. Video Enhancer Circuit

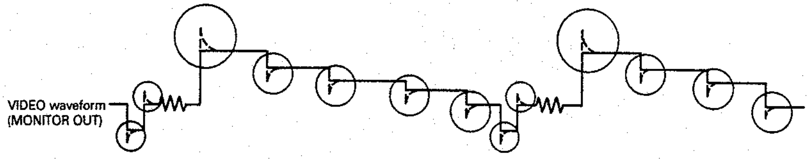
(1) Operation Check

(a) SHARPNESS



Gate of Q16	0	1	0	1	0	1	0	1
Gate of Q17	0	0	1	1	0	0	1	1
Gate of Q18	0	0	0	0	1	1	1	1

(Note) "0" corresponds to 0V, and "1" to 5V.


VIDEO waveform
(MONITOR OUT)

The overshooting amounts in the encircled sections increment in 7 steps as the effect is enhanced.

(2) Symptoms

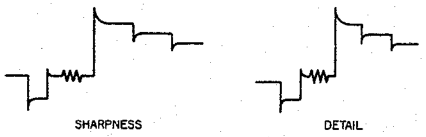
(I) The overshooting amounts vary in only 4 steps: D18 or Q16 may be faulty.

(II) The overshooting amounts vary in only 2 steps: D18, Q16, D19 or Q17 may be faulty.

* From the variation in the overshooting amounts, the faulty points can be assumed as shown in (I) and (II).

(b) DETAIL

The symptom is basically the same as "(a) SHARPNESS". However, the overshooting width is narrower.

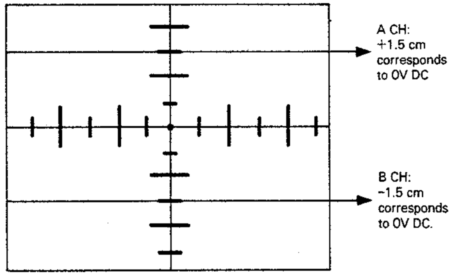

SHARPNESS
DETAIL

FAULT DIAGNOSTICS

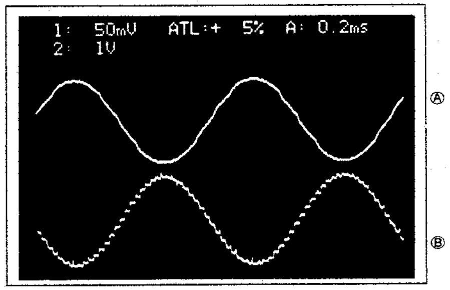
2. Digital Delay Circuit

As the components are closely related, the waveforms at major points should be compared with the normal waveforms.

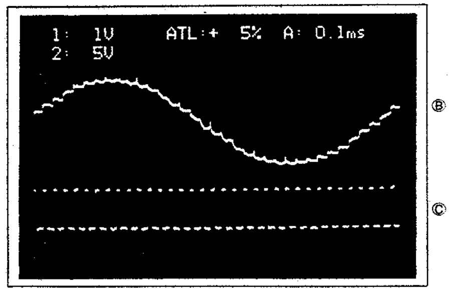
Points (A) to (F) mentioned below are shown in (2/3) of the circuit diagram.



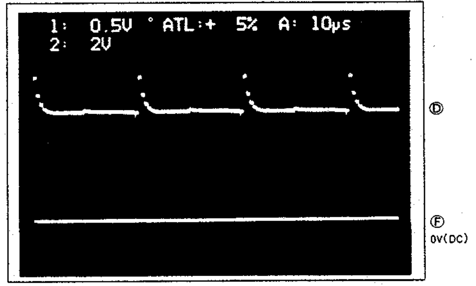
(1) Comparison between (A) and (B):
Apply a 1 kHz, 150 mV input to the L CH only.
The mode shall be THEATER or DOLBY SURROUND.
The Surround level VR shall be set at the position where the LED lights.



(2) Comparison between (B) and (C):
Same conditions as (1).

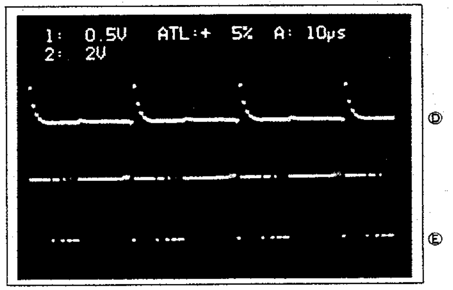


(3) Comparison between (D) and (E):
No input signal.
Same mode as (1).

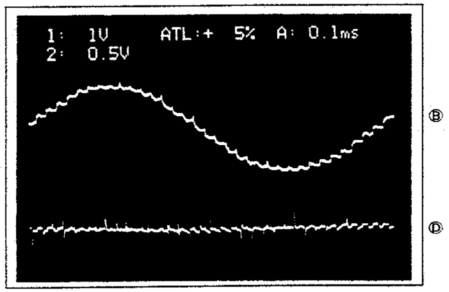


When VR1 (Offset adjustment) is varied, the waveform at (D) becomes a solid line or wavy line depending on whether the DC voltage at (F) deviates toward the positive or negative side from 0V.

(4) Comparison between (D) and (E):
No input signal.
Same mode as (1).



(5) Comparison between (D) and (E):
Same condition as (1).

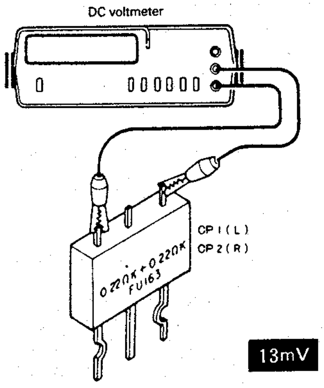


There is no change in the DC level.

ADJUSTMENTS

Order	Item	Input Setting	Output Setting	Amp Setting	Adjustment Points	Adjustment Method	Fig.
1	No signal current	—	Connect a DC voltmeter across the two ends of CP1 (L) or CP2 (R) (X09-).	VOLUME: 0	VR2(L) VR1(R) (X89-)	13mV	(a)
2	Superimpose H sync	Apply a video signal to the BS input.	Connect a TV to the MONITOR output.	INPUTSEL: BS	VR3 (X14-)	Adjust to the center of the range in which the H sync is stable.	
3	Superimpose V sync	Apply a video signal to the BS input.	Connect a TV to the MONITOR output.	INPUT SEL: BS	VR3 (X14-)	Adjust to the center of the range in which the V sync is stable.	
4	Digital delay offset adjustment	Apply a 1kHz, 150mV sine wave to the AUX L CH only.	Connect an oscilloscope across TP4 and TP5 (X14-).	INPUT SEL: AUX MODE: STEREO DOLBY LEVEL: MAX	VR4 (X14-)	Set the DC component to zero.	(b)
5	Digital delay level adjustment	Apply a 1 kHz, 150 mV sine wave to the AUX L CH only.	Connect an AC voltmeter across TP4 and TP5 (X14-).	INPUT SEL: AUX MODE: STEREO DOLBY LEVEL. MAX	VR5 (X14-)	190mV rms	(c)

(a)



VOLTAGE TABLE

(X09-2600-11)(A/3)

IC 5

12	−15V
13 ~ 15	0V
18	15V
19	15V

	B	C	E
Q5	0.7V	—	—
Q6	0.7V	—	—
Q11	4.8V	4.6V	−14.9V
Q12	4.8V	—	4.6V
Q13	4.8V	−14.9V	4.6V
Q23	−0.7V	1.1V	−1.3V
Q24	−0.7V	1.1V	−1.3V
Q25	0.5V	—	—
Q26	0.5V	54.1V	—
Q27	−0.7V	—	—
Q28	−0.7V	—	—
Q29	—	—	15.8V
Q30	—	—	−15.8V
Q31	16.9V	—	—
Q32	−16.9V	—	—
Q33	5.7V	16.9V	—
Q34	−0.6V	−16.9V	—

(X09-2600-11)(B/3)

IC 6

1 ~ 3	0V
5 ~ 7	0V

IC 7

1 ~ 3	0V
5 ~ 7	0V

	B	C	E
Q4	—	15V	—

IC 9

2	0V
3	0V
5	0V
7	0V

IC 10

1	0V
3	0V
5	0V
6	0V

(X13-5830-11)(A/3)

IC 1

1	−0.23V
2	−0.23V
4	−17V
5	−1.3V
6	2.8V
7	−27V
8	−28V
9	−30V
11	30V
14	−30V
15	−1.3V
17	−0.23V
18	−0.23V

	B	C	E
Q3	—	—	−5.0V
Q5	—	—	4.8V
Q6	—	—	4.8V
Q7	—	10V	5.6V

(X14-2270-11)(A/4)

IC 6

13	1.7V
15	1.3V

	B	C	E
Q4	—	—	−0.1V
Q7	—	—	−0.1V
Q13	0.9V	—	—
Q14	1.0V	—	—
Q27	—	—	−0.1V
Q28	—	10V	—
Q33	—	−10V	—

(X14-2270-11)(B/4)

IC 11

7	−5.8V
16	5.8V

IC 12

4	−6.2V

IC 13

26	12V
28	−12V

IC 14

33	5.2V
64	5.2V

IC 15

1	−12V
3	10V
6	−9.7V
16	12V

IC 16

24	5.2V

(X29-1930-00)(A/5)

IC 6

45	4.7V

	B	C	E
Q1	—	—	10.2V
Q3	—	5.1V	5.6V
Q4	—	4.8V	—

(X29-1930-00)(C15)

IC 4

7	5.3V
16	5.3V

IC 5

4	5.3V

IC 8

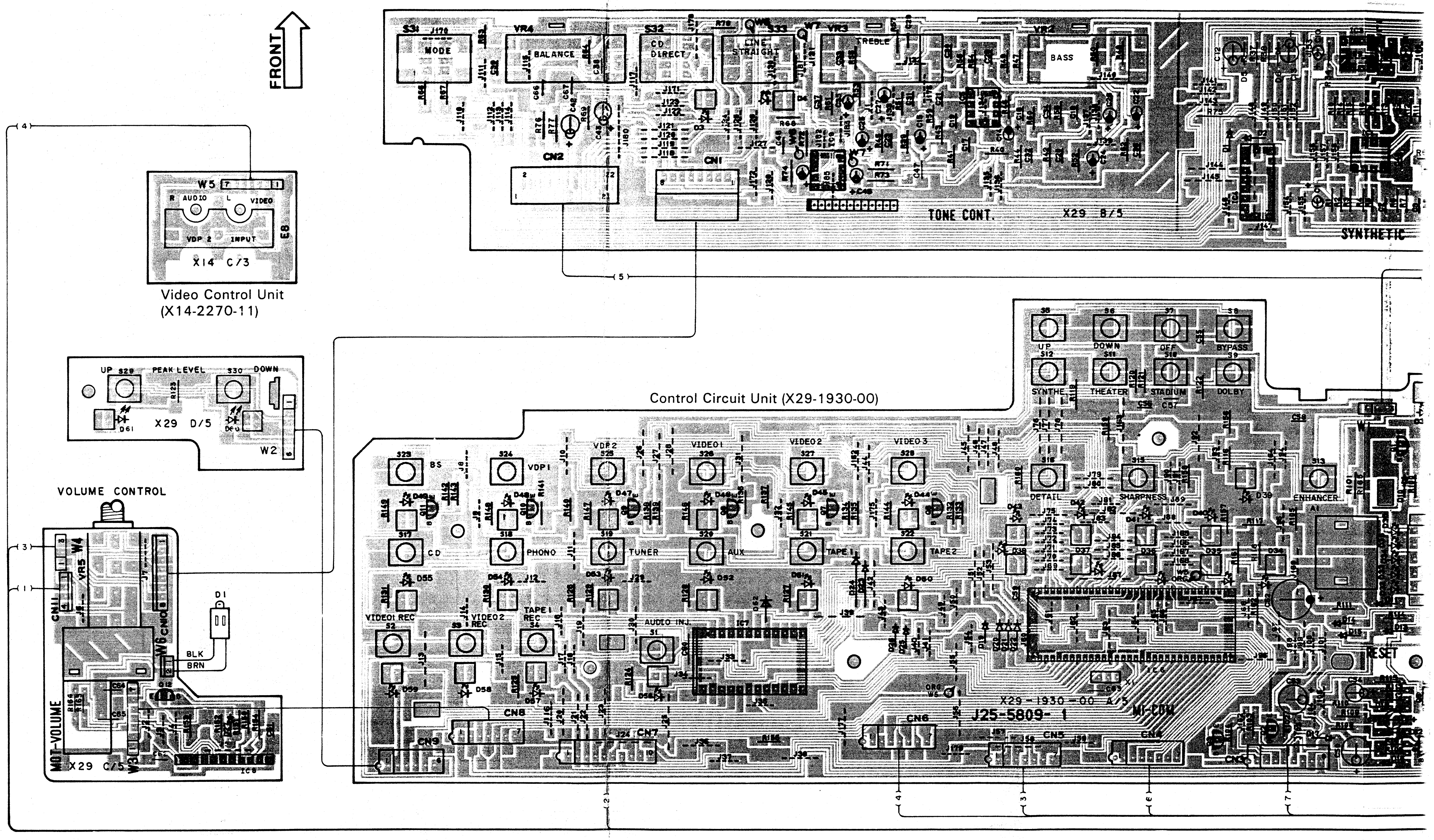
		Fader	UP	DOWN
2	—	—	4.9V	—
4	5.7V	6.7V	5.4V	5.4V
7	12V	—	—	—
10	—	6.2V	—	4.9V

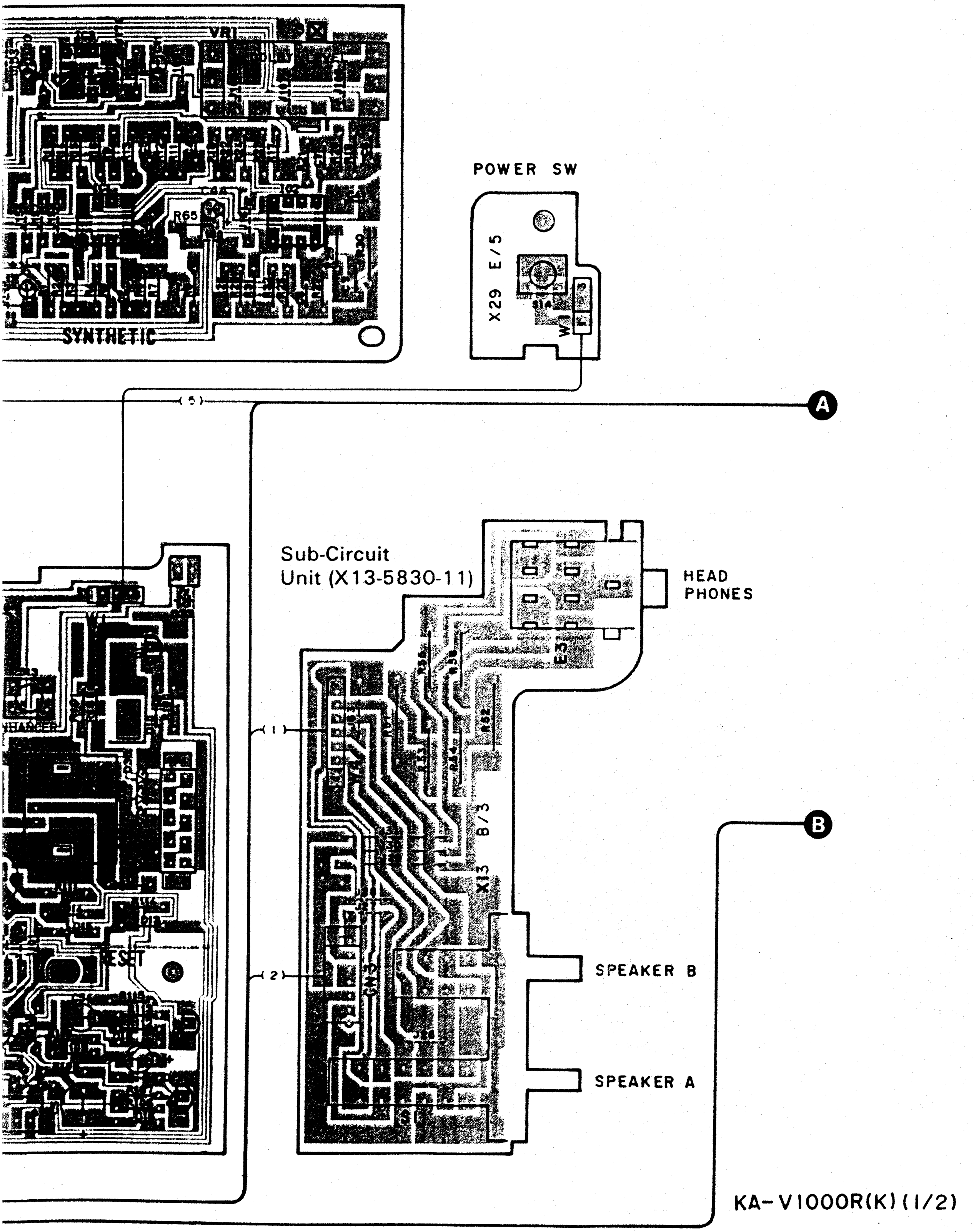
IC 9

4	5.3V

PC BOARD

(Component Side View)


FRONT
MODE
BALANCE
CD DIRECT
LINE STRAIGHT
TREBLE
BASS
CN2
CN1
TONE CONT.
X29 B/5
SYNTHETIC
W5
AUDIO
VIDEO
VDP 2
INPUT
X14 C/3
Video Control Unit
(X14-2270-11)
UP
PEAK LEVEL
DOWN
X29 D/5
W2
VOLUME CONTROL
W4
VR5
CN11
CN10
W6
BLK
BRN
D1
MOT-VOLUME
X29 C/5
W3
Control Circuit Unit (X29-1930-00)
BS
VDP1
VDP2
VIDEO1
VIDEO2
VIDEO3
CD
PHONO
TUNER
AUX
TAPE1
TAPE2
VIDEO1 REC
VIDEO2 REC
TAPE1 REC
AUDIO INJ.
IC7
CN9
CN8
CN7
CN6
CN5
CN4
X29-1930-00 A/5
J25-5809-1
M-COM
DOWN
OFF
BYPASS
UP
SYNTHE
THEATER
STADIUM
DOLBY
DETAIL
SHARPNESS
ENHANCER
RESET
IC6
(1)
(2)
(3)
(4)
(5)
(6)
(7)

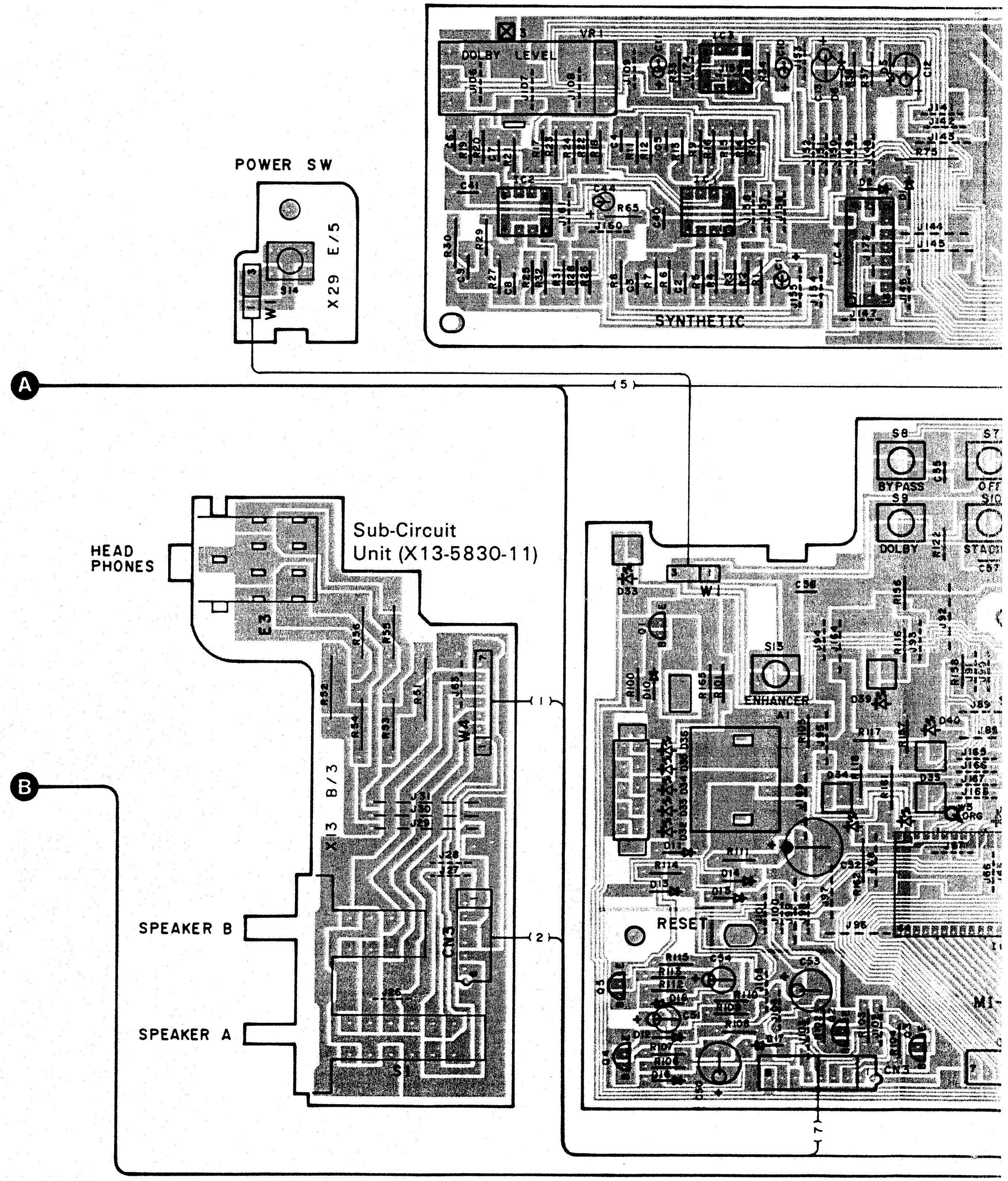

POWER SW
X29 E/5
S14
W1
VR1
R65
SYNTHETIC
Sub-Circuit
Unit (X13-5830-11)
HEAD
PHONES
E3
B/3
X13
CN3
SPEAKER B
SPEAKER A
RESET
HANCER
(5)
(1)
(2)
A
B

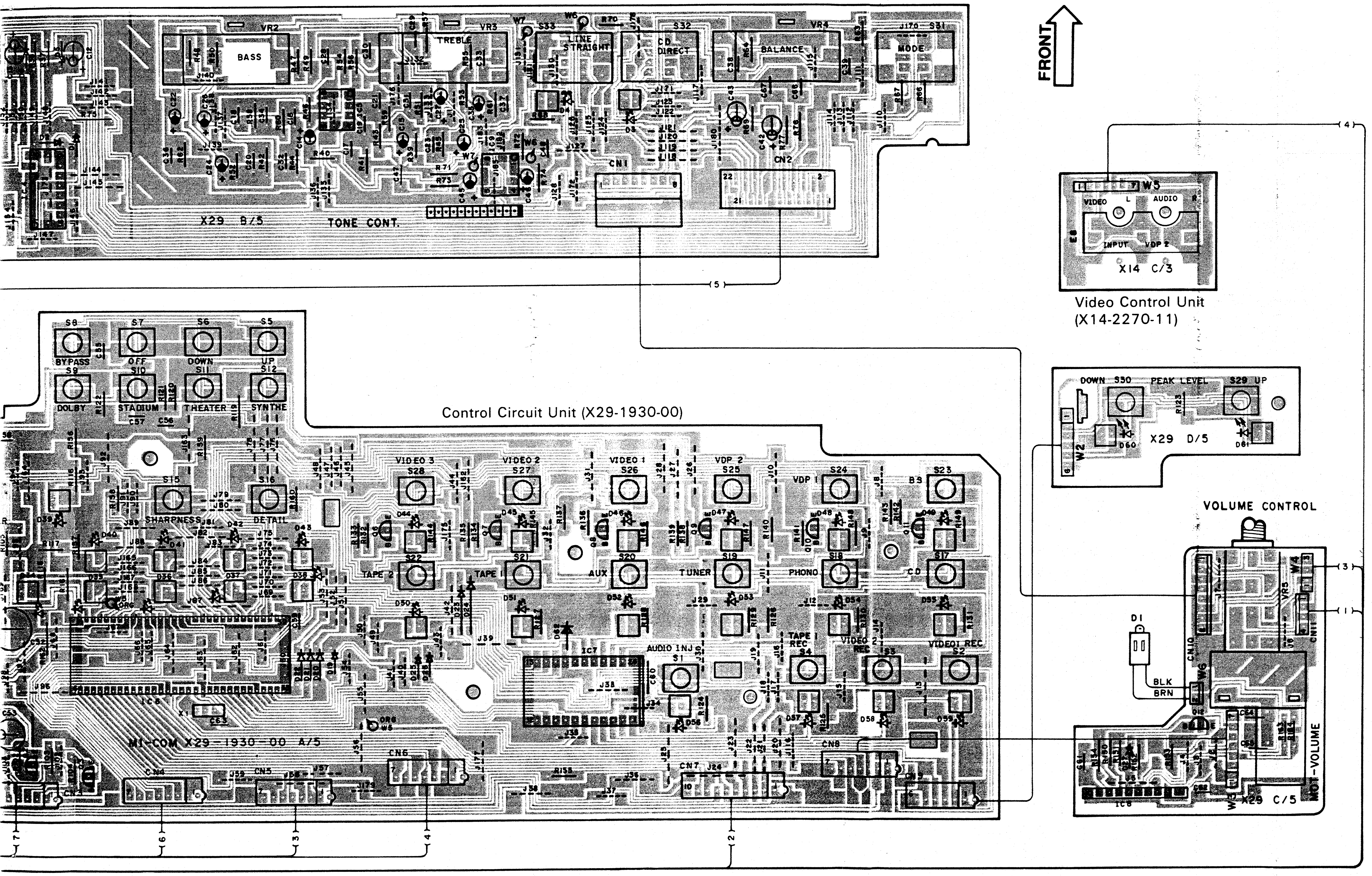
KA-V1000R(K) (1/2)

Refer to the schematic diagram for the values of resistors and capacitors.

PC BOARD

(Foil Side View)


POWER SW
X29 E/5
S14
W1
DOLBY LEVEL
VR1
R65
SYNTHETIC
HEAD
PHONES
Sub-Circuit
Unit (X13-5830-11)
E3
B/3
X13
W4
CN3
SPEAKER B
SPEAKER A
S8
BYPASS
S9
DOLBY
S7
OFF
STADI
S15
ENHANCER
RESET
CN1
(5)
(1)
(2)
(7)
A
B

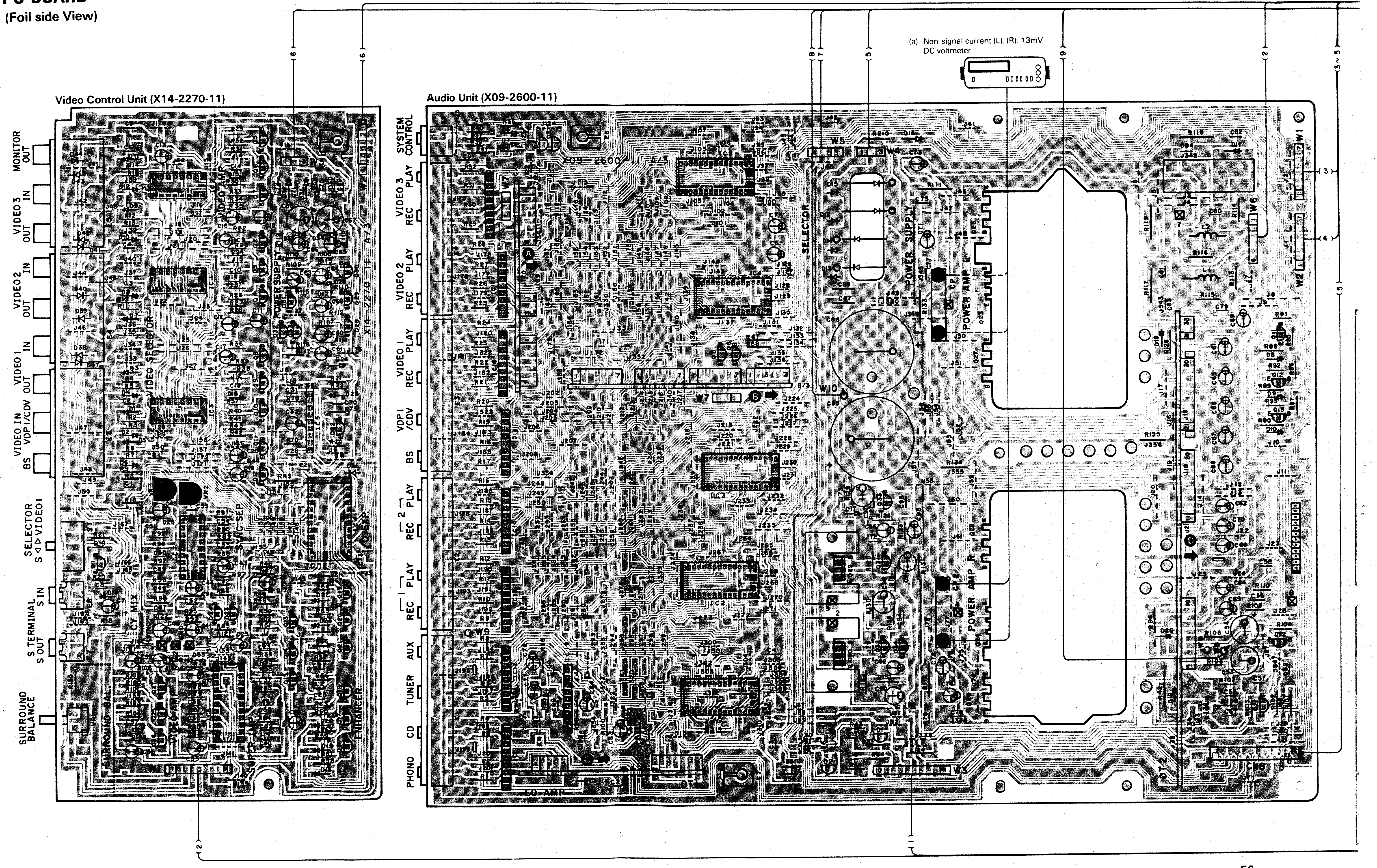

BASS
TREBLE
LINE STRAIGHT
CD DIRECT
BALANCE
MODE
VR2
VR3
VR4
S33
S32
S31
CN1
CN2
X29 B/5
TONE CONT.
FRONT
W5
VIDEO
AUDIO
INPUT
VDP 2
X14 C/3
Video Control Unit
(X14-2270-11)
DOWN S30
PEAK LEVEL
S29 UP
X29 D/5
VOLUME CONTROL
BYPASS
OFF
DOWN
UP
DOLBY
STADIUM
THEATER
SYNTHE
SHARPNESS
DETAIL
Control Circuit Unit (X29-1930-00)
VIDEO 3
VIDEO 2
VIDEO 1
VDP 2
VDP 1
TAPE 2
TAPE 1
AUX
TUNER
PHONO
CD
AUDIO INJ
TAPE 1 REC
VIDEO 2 REC
VIDEO1 REC
IC7
IC8
MI-COM X29-1930-00 A/5
CN4
CN5
CN6
CN7
CN8
CN10
CN11
D1
BLK
BRN
MOT-VOLUME
X29 C/5
1
2
3
4
5
6
7

KA-V1000R(K)(1/2)

Refer to the schematic diagram for the values of resistors and capacitors.

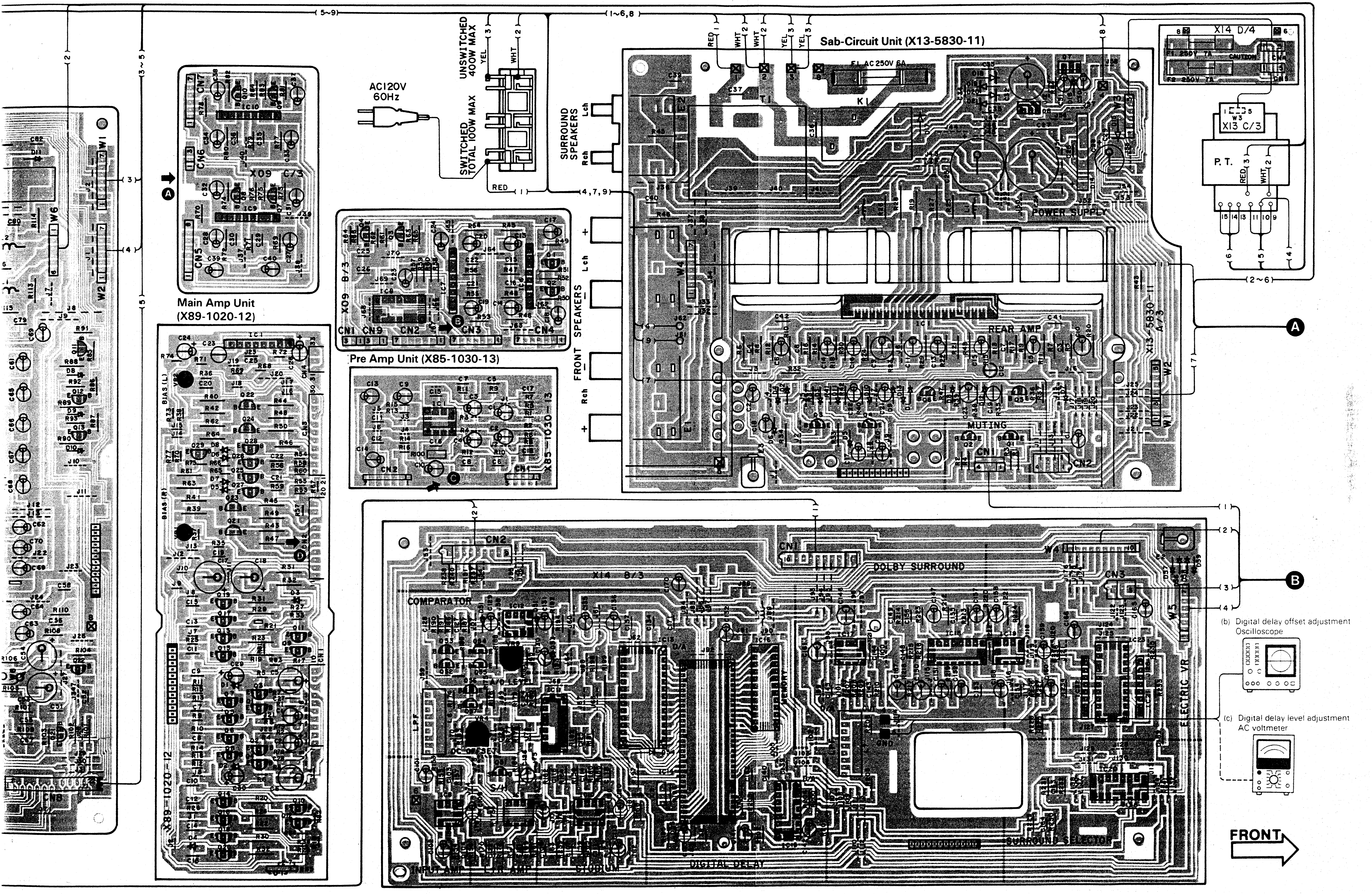
PC BOARD

(Foil side View)



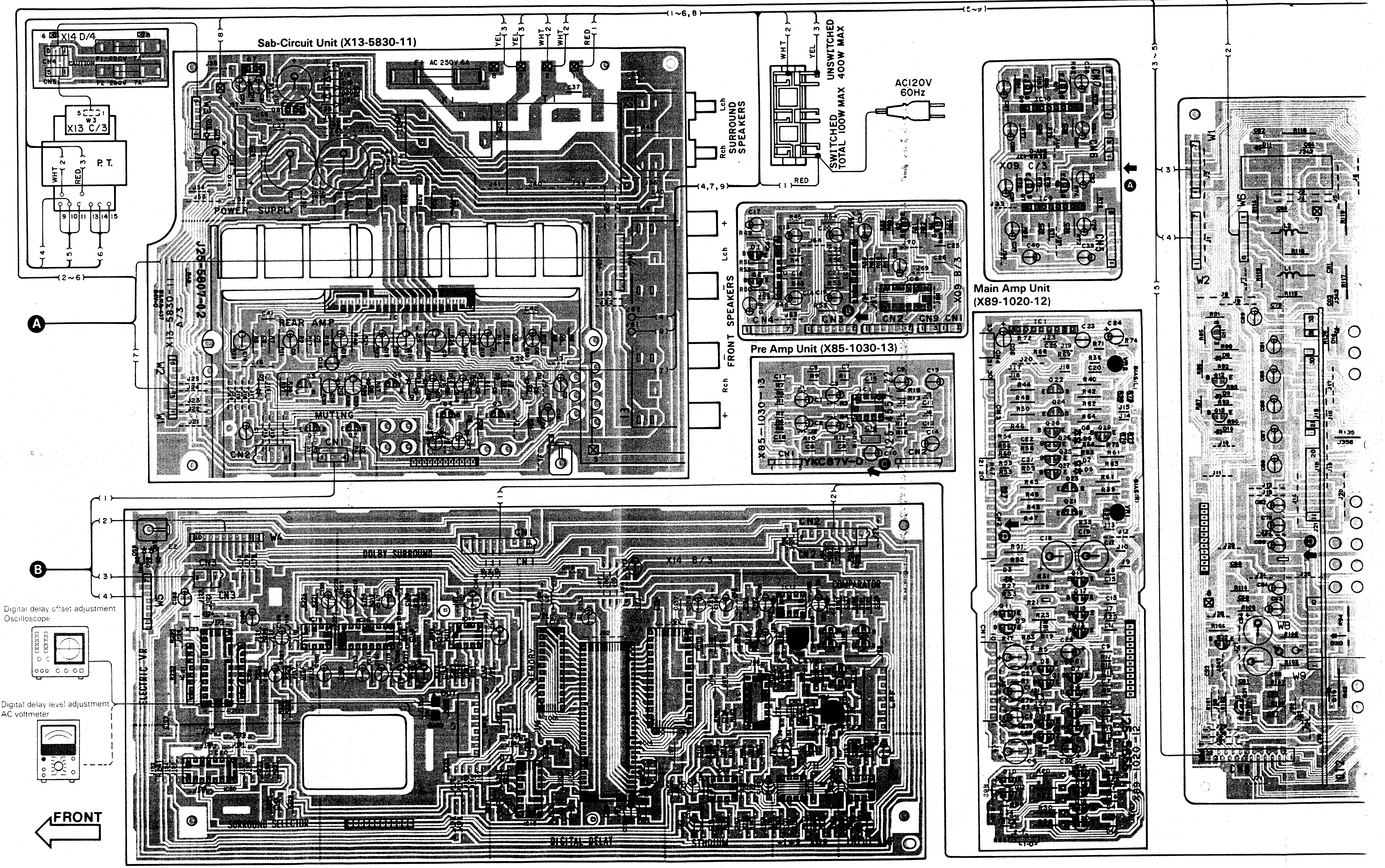
(a) Non-signal current (L), (R): 13mV
DC voltmeter

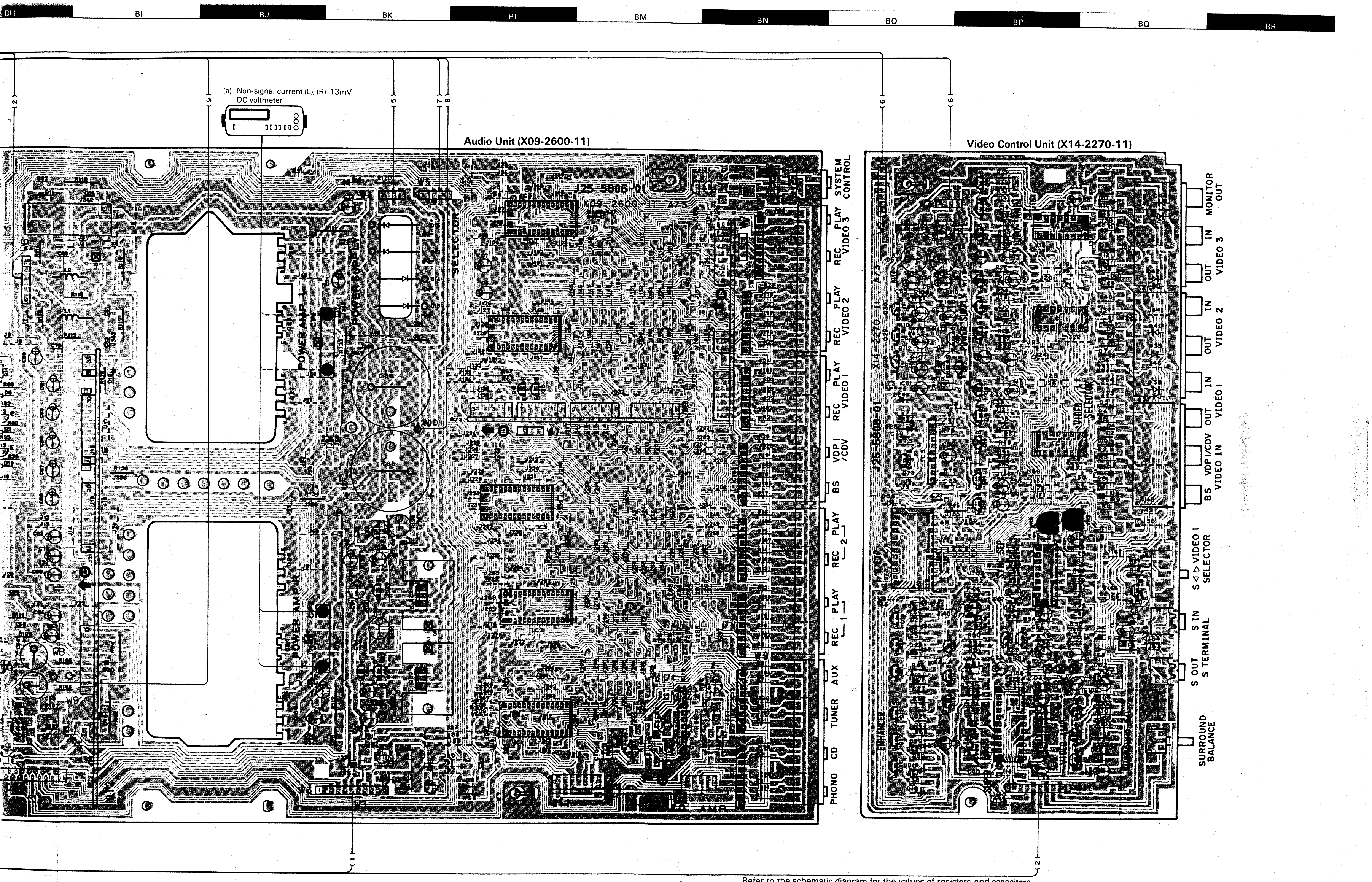
Video Control Unit (X14-2270-11)
Audio Unit (X09-2600-11)
MONITOR OUT
VIDEO 3 IN
VIDEO 3 OUT
VIDEO 2 IN
VIDEO 2 OUT
VIDEO 1 IN
VIDEO 1 OUT
VIDEO IN VDP1/CDV
BS
SELECTOR S ◁ ▷ VIDEO1
S TERMINAL S IN
S OUT
SURROUND BALANCE
SYSTEM CONTROL
VIDEO 3 PLAY
REC
VIDEO 2 PLAY
REC
VIDEO 1 PLAY
REC
VDP1 /CDV
BS
2 PLAY
REC
1 PLAY
REC
AUX
TUNER
CD
PHONO
VIDEO SELECTOR
VIDEO AMP
POWER SUPPLY
SYNC SEP
Y/C MIX
VIDEO AMP
SURROUND BAL
SUPER AMP
ENHANCER
X14-2270-11 A/3
X09-2600-11 A/3
SELECTOR
POWER SUPPLY
POWER AMP L
POWER AMP R
EQ AMP
W1
W2
W3
W4
W5
W6
W7
W9
W10
IC1
IC2
IC3
IC4
A
B
6
6
8
7
5
9
2
3~5
3
4
5
2
1


AC120V
60Hz
UNSWITCHED 400W MAX
SWITCHED TOTAL 100W MAX
YEL
WHT
RED
Sab-Circuit Unit (X13-5830-11)
X14 D/4
X13 C/3
P. T.
SURROUND SPEAKERS
FRONT SPEAKERS
Lch
Rch
POWER SUPPLY
REAR AMP
MUTING
X13-5830-11 A/3
Main Amp Unit
(X89-1020-12)
X09 C/3
X09 B/3
Pre Amp Unit (X85-1030-13)
X85-1030-13
X89-1020-12
BIAS (L)
BIAS (R)
DOLBY SURROUND
X14 B/3
COMPARATOR
LPF
DC OFFSET
ELECTRIC VR
SURROUND SELECTOR
INPUT AMP
DIGITAL DELAY
(b) Digital delay offset adjustment
Oscilloscope
(c) Digital delay level adjustment
AC voltmeter
FRONT
A
B
C
D

Refer to the schematic diagram for the values of resistors and capacitors.

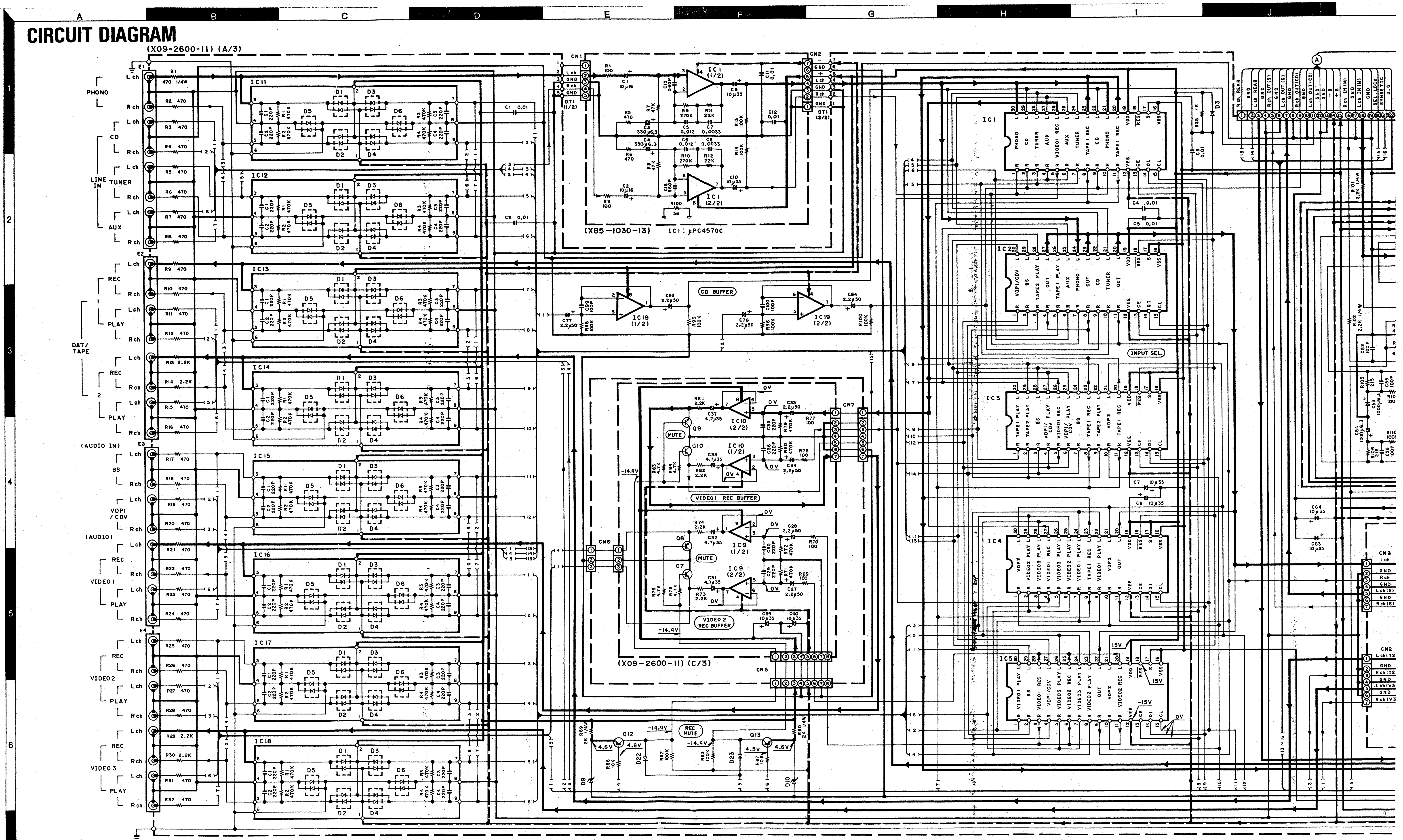
PC BOARD (Component side View)


AY
AZ
BA
BB
BC
BD
BE
BF
BG
BH
BI
1
2
3
4
5
6
7
Sab-Circuit Unit (X13-5830-11)
X14 D/4
X13 C/3
P. T.
WHT
RED
YEL
(1~6, 8)
(5~9)
(2~6)
(4, 7, 9)
POWER SUPPLY
REAR AMP
MUTING
J25-5907-02
X13-5830-11 A/3
SURROUND SPEAKERS
Lch
Rch
FRONT SPEAKERS
UNSWITCHED 400W MAX
SWITCHED TOTAL 100W MAX
AC120V 60Hz
X09 C/3
X09 B/3
Pre Amp Unit (X85-1030-13)
X85-1030-13
Main Amp Unit (X89-1020-12)
X89-1020-12
A
B
DOLBY SURROUND
X14 B/3
COMPARATOR
MEMORY
ELECTRIC VR
SURROUND SELECTOR
DIGITAL DELAY
(b) Digital delay offset adjustment
Oscilloscope
(c) Digital delay level adjustment
AC voltmeter
FRONT
W1
W2
W5
W6
W8
W9

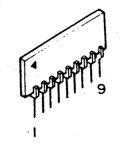

BH
BI
BJ
BK
BL
BM
BN
BO
BP
BQ
BR
(a) Non-signal current (L), (R): 13mV
DC voltmeter
Audio Unit (X09-2600-11)
Video Control Unit (X14-2270-11)
J25-5806-01
X09-2600
X14-2270
J25-5808-01
POWER AMP L
POWER AMP R
POWER SUPPLY
SELECTOR
W4
W5
W7
W8
W9
W10
SYSTEM CONTROL
PLAY VIDEO 3 REC
PLAY VIDEO 2 REC
PLAY VIDEO 1 REC
VDP1 /CDV
BS
PLAY 2 REC
PLAY 1 REC
AUX
TUNER
CD
PHONO
MONITOR OUT
IN VIDEO 3 OUT
IN VIDEO 2 OUT
IN VIDEO 1 OUT
VDP1/CDV VIDEO IN
BS
S◁▷VIDEO 1 SELECTOR
S IN
S OUT S TERMINAL
SURROUND BALANCE
VIDEO SELECTOR
SYNC SEP
ENHANCER
1
2
5
6
7
8
9

Refer to the schematic diagram for the values of resistors and capacitors.

CIRCUIT DIAGRAM

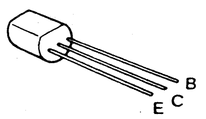

A
B
C
D
E
F
G
H
I
J
(X09-2600-11) (A/3)
(X85-1030-13)
IC1 : μPC4570C
(X09-2600-11) (C/3)
PHONO
CD
LINE IN
TUNER
AUX
DAT/TAPE
REC
PLAY
(AUDIO IN)
BS
VDP1/CDV
(AUDIO)
VIDEO1
VIDEO2
VIDEO3
Lch
Rch
E1
E2
E3
E4
IC11
IC12
IC13
IC14
IC15
IC16
IC17
IC18
IC1
IC1 (1/2)
IC1 (2/2)
IC3
IC4
IC5
IC9 (1/2)
IC9 (2/2)
IC10 (1/2)
IC10 (2/2)
IC19 (1/2)
IC19 (2/2)
IC29
CD BUFFER
INPUT SEL.
VIDEO1 REC BUFFER
VIDEO 2 REC BUFFER
MUTE
REC MUTE
Q7
Q8
Q9
Q10
Q12
Q13
CN1
CN2
CN3
CN5
CN6
CN7
-14.9V
4.6V
4.8V
4.5V
15V
-15V
0V
R1 470 1/4W
R13 2.2K
R14 2.2K
R29 2.2K
R30 2.2K
C1 0.01
C2 0.01
R35 1K
D3
R101 2.2K 1/4W
R102 2.2K 1/4W
PHONO
CD
TUNER
AUX
VIDEO1 REC
TAPE1 REC
VDD
RES
VSS
VEE
CE
DI
CL
Rch REAR
Lch REAR
GND
Rch OUT(S)
Lch OUT(S)
Rch OUT(CD)
Lch OUT(CD)
+B
-B
Rch IN(M)
Lch IN(M)
SEL.LOCK
SYNSETIC
D.G
Lch(S)
Rch(S)
Lch(T2)
Rch(T2)
Lch(V3)
Rch(V3)

KAZ01

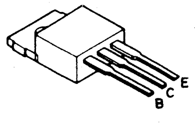


2SA1123
2SA1286
2SA733(A)
2SA954
2SA992
2SA999

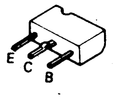
2SC1845
2SC2003
2SC2320
2SC2631
2SC2878
2SC945(A)



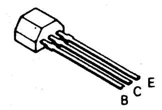
2SD1266



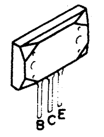
2SC3666



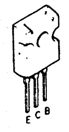
2SA933S
2SC1740S



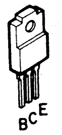
2SA1215＊5
2SC2921＊5



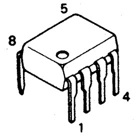
2SC3419



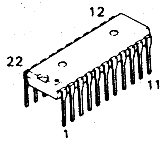
2SA1535
2SB941
2SC3944



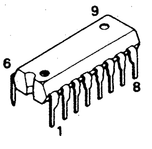
TL810CP



MB88323A-K2



NE645N
PCM56P



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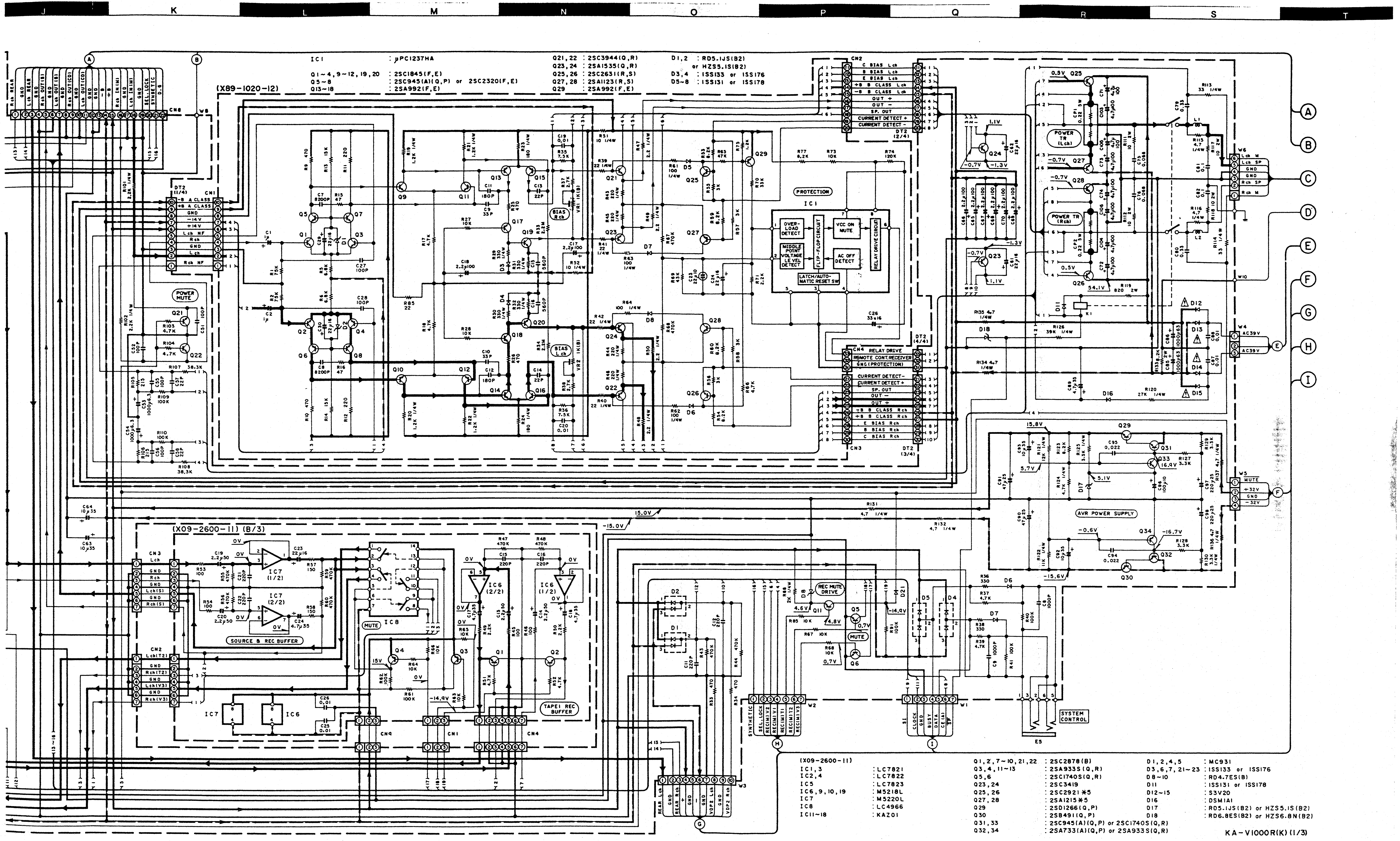
J
K
L
M
N
O
P
Q
R
S
T
(X89-1020-12)
IC1 : μPC1237HA
Q1~4, 9~12, 19, 20 : 2SC1845(F,E)
Q5~8 : 2SC945(A)(Q,P) or 2SC2320(F,E)
Q13~18 : 2SA992(F,E)
Q21, 22 : 2SC3944(Q,R)
Q23, 24 : 2SA1535(Q,R)
Q25, 26 : 2SC2631(R,S)
Q27, 28 : 2SA1123(R,S)
Q29 : 2SA992(F,E)
D1, 2 : RD5.1JS(B2) or HZS5.1S(B2)
D3, 4 : 1SS133 or 1SS176
D5~8 : 1SS131 or 1SS178
PROTECTION
OVER-LOAD DETECT
MIDDLE POINT VOLTAGE LEVEL DETECT
FLIP-FLOP CIRCUIT
VCC ON MUTE
AC OFF DETECT
RELAY DRIVE CIRCUIT
LATCH/AUTO-MATIC RESET SW
POWER MUTE
BIAS Rch
BIAS Lch
POWER TR (Lch)
POWER TR (Rch)
AVR POWER SUPPLY
(X09-2600-11) (B/3)
SOURCE & REC BUFFER
MUTE
TAPE1 REC BUFFER
REC MUTE DRIVE
SYSTEM CONTROL
(X09-2600-11)
IC1, 3 : LC7821
IC2, 4 : LC7822
IC5 : LC7823
IC6, 9, 10, 19 : M5218L
IC7 : M5220L
IC8 : LC4966
IC11~18 : KAZ01
Q1, 2, 7~10, 21, 22 : 2SC2878(B)
Q3, 4, 11~13 : 2SA933S(Q,R)
Q5, 6 : 2SC1740S(Q,R)
Q23, 24 : 2SC3419
Q25, 26 : 2SC2921 ✱5
Q27, 28 : 2SA1215 ✱5
Q29 : 2SD1266(Q,P)
Q30 : 2SB491(Q,P)
Q31, 33 : 2SC945(A)(Q,P) or 2SC1740S(Q,R)
Q32, 34 : 2SA733(A)(Q,P) or 2SA933S(Q,R)
D1, 2, 4, 5 : MC931
D3, 6, 7, 21~23 : 1SS133 or 1SS176
D8~10 : RD4.7ES(B)
D11 : 1SS131 or 1SS178
D12~15 : S3V20
D16 : DSM1A1
D17 : RD5.1JS(B2) or HZS5.1S(B2)
D18 : RD6.8ES(B2) or HZS6.8N(B2)
KA-V1000R(K) (1/3)

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ınufacturer's recommended parts (refer
Indicates safety critical components. To
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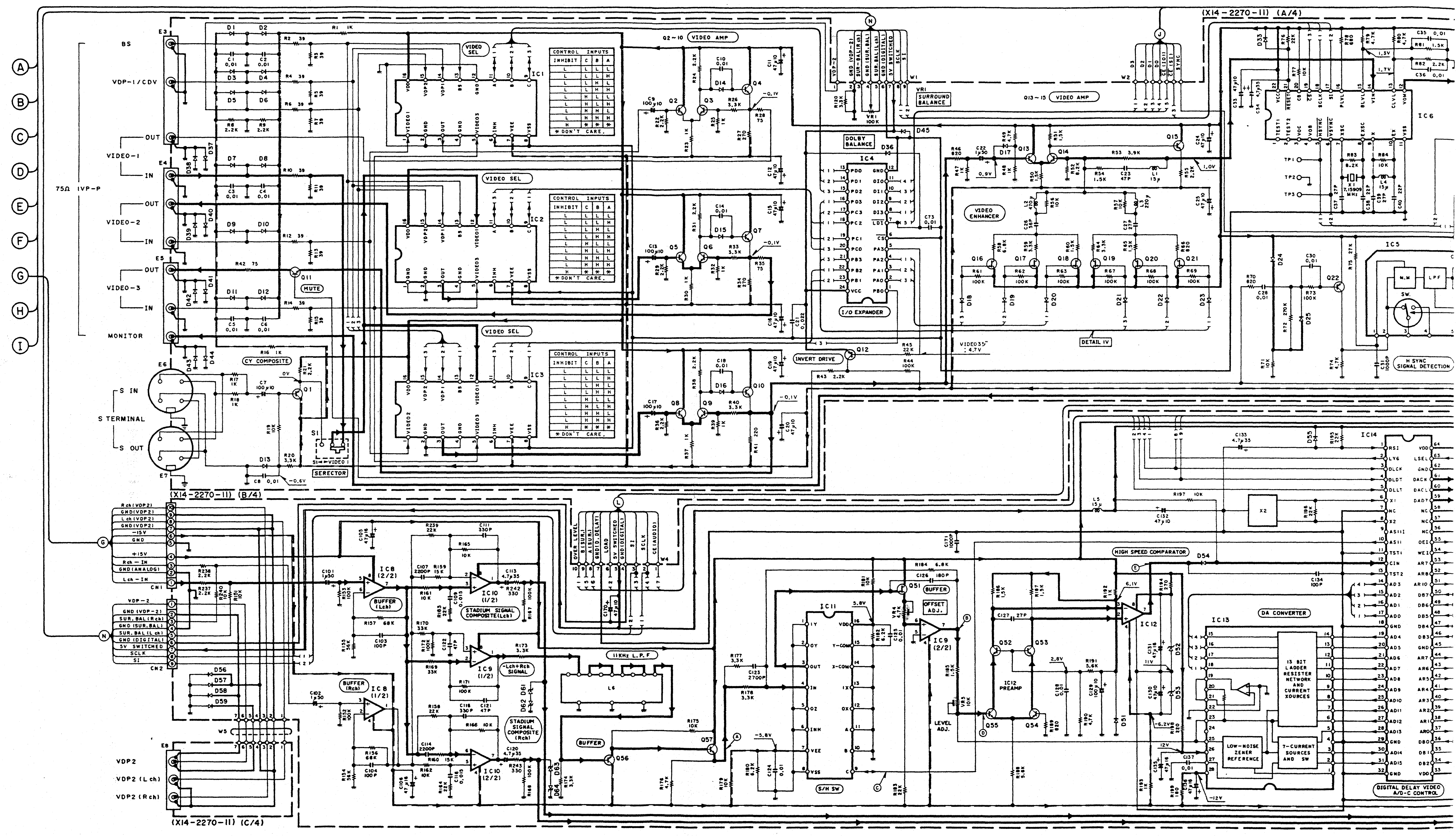
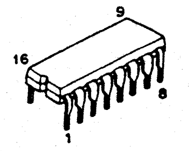
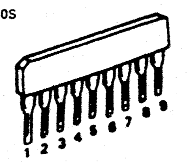
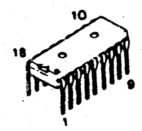
KA-V1000R
KENWOOD

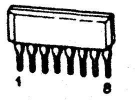
CIRCUIT DIAGRAM

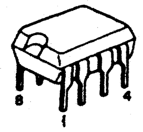

(X14-2270-11) (A/4)
(X14-2270-11) (B/4)
(X14-2270-11) (C/4)
BS
VDP-1/CDV
VIDEO-1
VIDEO-2
VIDEO-3
OUT
IN
75Ω 1VP-P
MONITOR
S IN
S TERMINAL
S OUT
MUTE
CY COMPOSITE
SELECTOR
VIDEO SEL
CONTROL INPUTS
INHIBIT C B A
* DON'T CARE.
IC1
IC2
IC3
Q2~10 VIDEO AMP
Q13~15 VIDEO AMP
SURROUND BALANCE
DOLBY BALANCE
IC4
I/O EXPANDER
INVERT DRIVE
VIDEO ENHANCER
DETAIL IV
IC5
IC6
H SYNC SIGNAL DETECTION
IC14
DIGITAL DELAY VIDEO A/D-C CONTROL
HIGH SPEED COMPARATOR
DA CONVERTER
IC13
13 BIT LADDER RESISTER NETWORK AND CURRENT XOURCES
LOW-NOISE ZENER REFERENCE
7-CURRENT SOURCES AND SW
IC12
IC12 PREAMP
LEVEL ADJ.
OFFSET ADJ.
BUFFER
IC11
S/H SW
11KHz L.P.F
BUFFER (Lch)
BUFFER (Rch)
STADIUM SIGNAL COMPOSITE (Lch)
STADIUM SIGNAL COMPOSITE (Rch)
-Lch+Rch SIGNAL
IC8 (2/2)
IC8 (1/2)
IC9 (1/2)
IC9 (2/2)
IC10 (1/2)
IC10 (2/2)
Rch (VDP2)
GND (VDP2)
Lch (VDP2)
-15V
GND
+15V
Rch-IN
GND (ANALOG)
Lch-IN
CN1
VDP-2
GND (VDP-2)
SUR. BAL (Rch)
GND (SUR. BAL)
SUR. BAL (Lch)
GND (DIGITAL)
5V SWITCHED
SCLK
SI
CN2
VDP2
VDP2 (L ch)
VDP2 (R ch)
VIDEO 35″ : 4.7V
TP1
TP2
TP3
X1 7.15909 MHz
X2

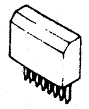

TC4051BP
TC4052BP
TC4053BP

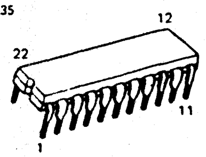

NJM2220S

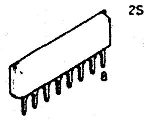

LA7820

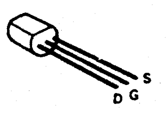

M5220L

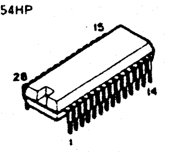

M5218P-A
UPC4570C


M5218L


LC7535


UPC1237HA


2SK105


PCM54HP

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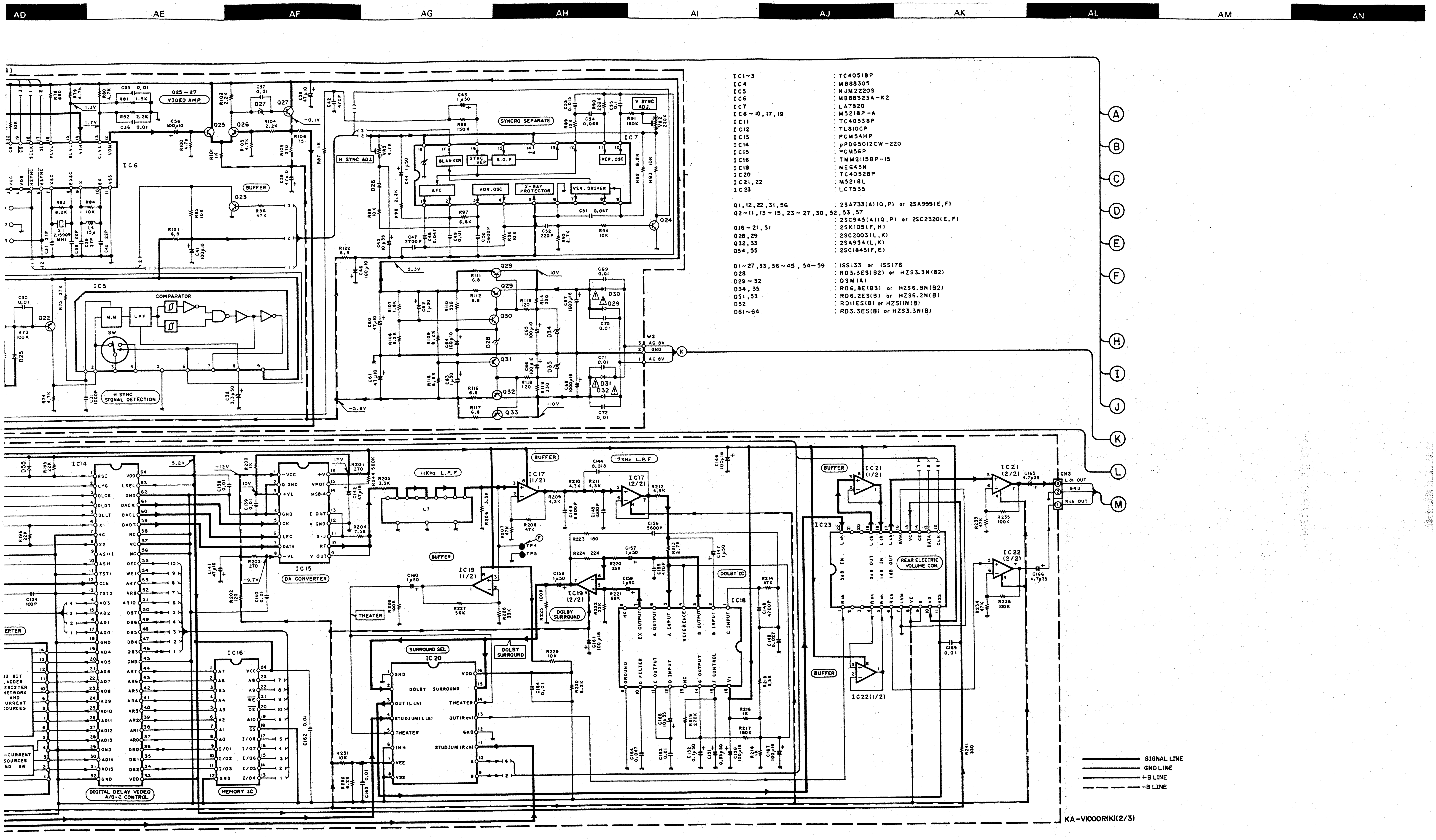
AD
AE
AF
AG
AH
AI
AJ
AK
AL
AM
AN
VIDEO AMP
Q25~27
SYNCRO SEPARATE
V SYNC ADJ.
H SYNC ADJ
BLANKER
SYNC SEP
B.G.P
VER. OSC
AFC
HOR. OSC
X-RAY PROTECTOR
VER. DRIVER
IC5
IC6
IC7
BUFFER
COMPARATOR
M.M
LPF
SW.
H SYNC SIGNAL DETECTION
IC14
DIGITAL DELAY VIDEO A/D-C CONTROL
IC15
DA CONVERTER
IC16
MEMORY IC
11KHz L.P.F
7KHz L.P.F
IC17 (1/2)
IC17 (2/2)
IC19 (1/2)
IC19 (2/2)
THEATER
DOLBY SURROUND
SURROUND SEL
IC 20
IC18
DOLBY IC
IC21 (1/2)
IC21 (2/2)
IC22 (2/2)
IC22(1/2)
IC23
REAR ELECTRIC VOLUME CON.
CN3
L ch OUT
GND
R ch OUT
W3
AC 8V
GND
AC 8V
A
B
C
D
E
F
H
I
J
K
L
M
SIGNAL LINE
GND LINE
+B LINE
-B LINE
KA-V1000R(K)(2/3)

IC1~3	: TC4051BP
IC4	: MB88305
IC5	: NJM2220S
IC6	: MB88323A-K2
IC7	: LA7820
IC8~10, 17, 19	: M5218P-A
IC11	: TC4053BP
IC12	: TL810CP
IC13	: PCM54HP
IC14	: μPD65012CW-220
IC15	: PCM56P
IC16	: TMM2115BP-15
IC18	: NE645N
IC20	: TC4052BP
IC21, 22	: M5218L
IC23	: LC7535
Q1, 12, 22, 31, 56	: 2SA733(A)(Q, P) or 2SA999(E, F)
Q2~11, 13~15, 23~27, 30, 52, 53, 57	: 2SC945(A)(Q, P) or 2SC2320(E, F)
Q16~21, 51	: 2SK105(F, H)
Q28, 29	: 2SC2003(L, K)
Q32, 33	: 2SA954(L, K)
Q54, 55	: 2SC1845(F, E)
D1~27, 33, 36~45, 54~59	: 1SS133 or 1SS176
D28	: RD3.3ES(B2) or HZS3.3N(B2)
D29~32	: DSM1A1
D34, 35	: RD6.8E(B3) or HZS6.8N(B2)
D51, 53	: RD6.2ES(B) or HZS6.2N(B)
D52	: RD11ES(B) or HZS11N(B)
D61~64	: RD3.3ES(B) or HZS3.3N(B)

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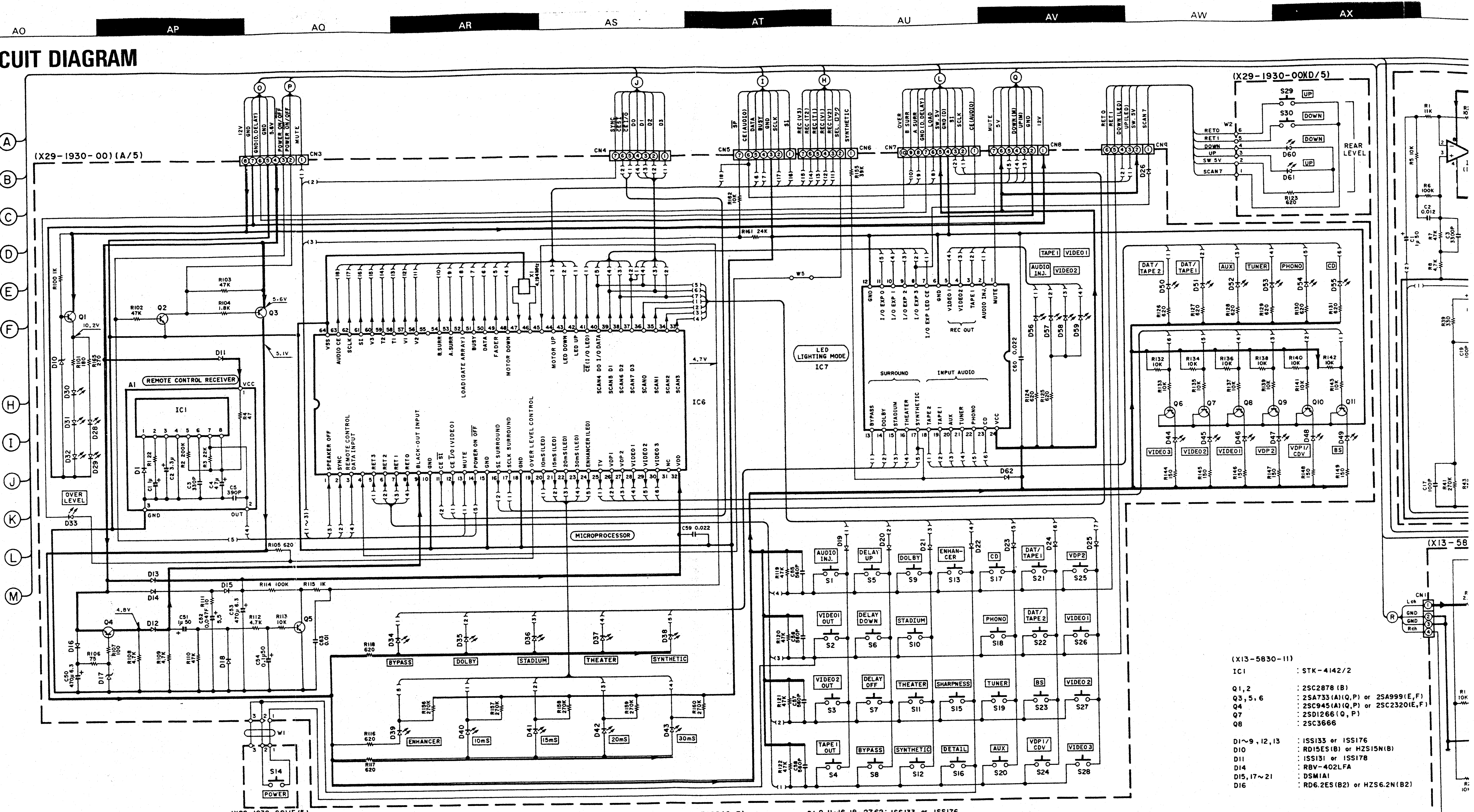
KA-V1000R

KENWOOD

CIRCUIT DIAGRAM


AO
AP
AQ
AR
AS
AT
AU
AV
AW
AX
1
2
3
4
5
6
7
(X29-1930-00)(A/5)
(X29-1930-00KD/5)
(X29-1930-00)(E/5)
(X13-58
CN3
CN4
CN5
CN6
CN7
CN8
CN9
CN1
IC1
IC6
IC7
A1
REMOTE CONTROL RECEIVER
MICROPROCESSOR
LED LIGHTING MODE
OVER LEVEL
REAR LEVEL
POWER
S14
W1
W2
W5
X1 4.194MHz
BYPASS
DOLBY
STADIUM
THEATER
SYNTHETIC
ENHANCER
10mS
15mS
20mS
30mS
AUDIO INJ.
DELAY UP
DELAY DOWN
DELAY OFF
ENHAN-CER
CD
DAT/TAPE1
DAT/TAPE2
VDP2
VDP1/CDV
VIDEO1 OUT
VIDEO2 OUT
VIDEO1
VIDEO2
VIDEO3
PHONO
TUNER
AUX
SHARPNESS
DETAIL
BS
TAPE1 OUT
TAPE1
UP
DOWN
Lch
GND
Rch
SURROUND
INPUT AUDIO
REC OUT

(X13-5830-11)

IC1 : STK-4142/2

Q1,2 : 2SC2878 (B)
Q3,5,6 : 2SA733(A)(Q,P) or 2SA999(E,F)
Q4 : 2SC945(A)(Q,P) or 2SC2320(E,F)
Q7 : 2SD1266(Q, P)
Q8 : 2SC3666

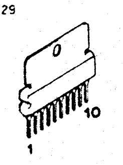
D1~9, 12, 13 : 1SS133 or 1SS176
D10 : RD15ES(B) or HZS15N(B)
D11 : 1SS131 or 1SS178
D14 : RBV-402LFA
D15, 17~21 : DSM1A1
D16 : RD6.2ES(B2) or HZS6.2N(B2)

IC1~3 : M5218P-A
IC4 : TC4053BP
IC5,9 : μPC4570C
IC6 : μPD75106CW-076
IC7 : MB88304-P
IC8 : BA6229

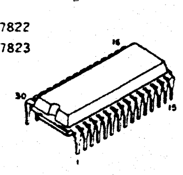
Q1, 2, 5, 12 : 2SC945(A)(Q,P) or 2SC1740S(Q,R)
Q3 : 2SA954(L,K)
Q4 : 2SA1286
Q6~11 : 2SA733(A)(Q,P) or 2SA999 (E,F)

D1,2,11~16,18~27,62 : 1SS133 or 1SS176
D5,6 : RD8.2ES(B2) or HZS8.2N(B2)
D10 : RD11ES(B) or HZS11N(B)
D17 : RD4.7ES(B) or HZS4.7N(B)

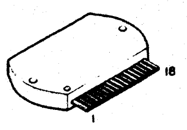
BA6229



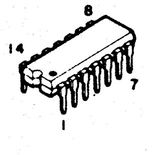
LC7822
LC7823



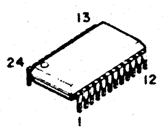
STK-4142/2



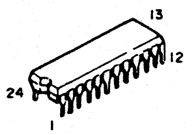
LC4966



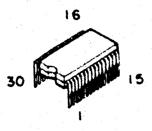
MB88304-P
MB88305



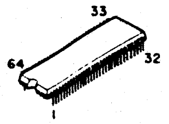
TMM2115BP-15



LC7821



μPD65012CW-220
μPD75106CW-076



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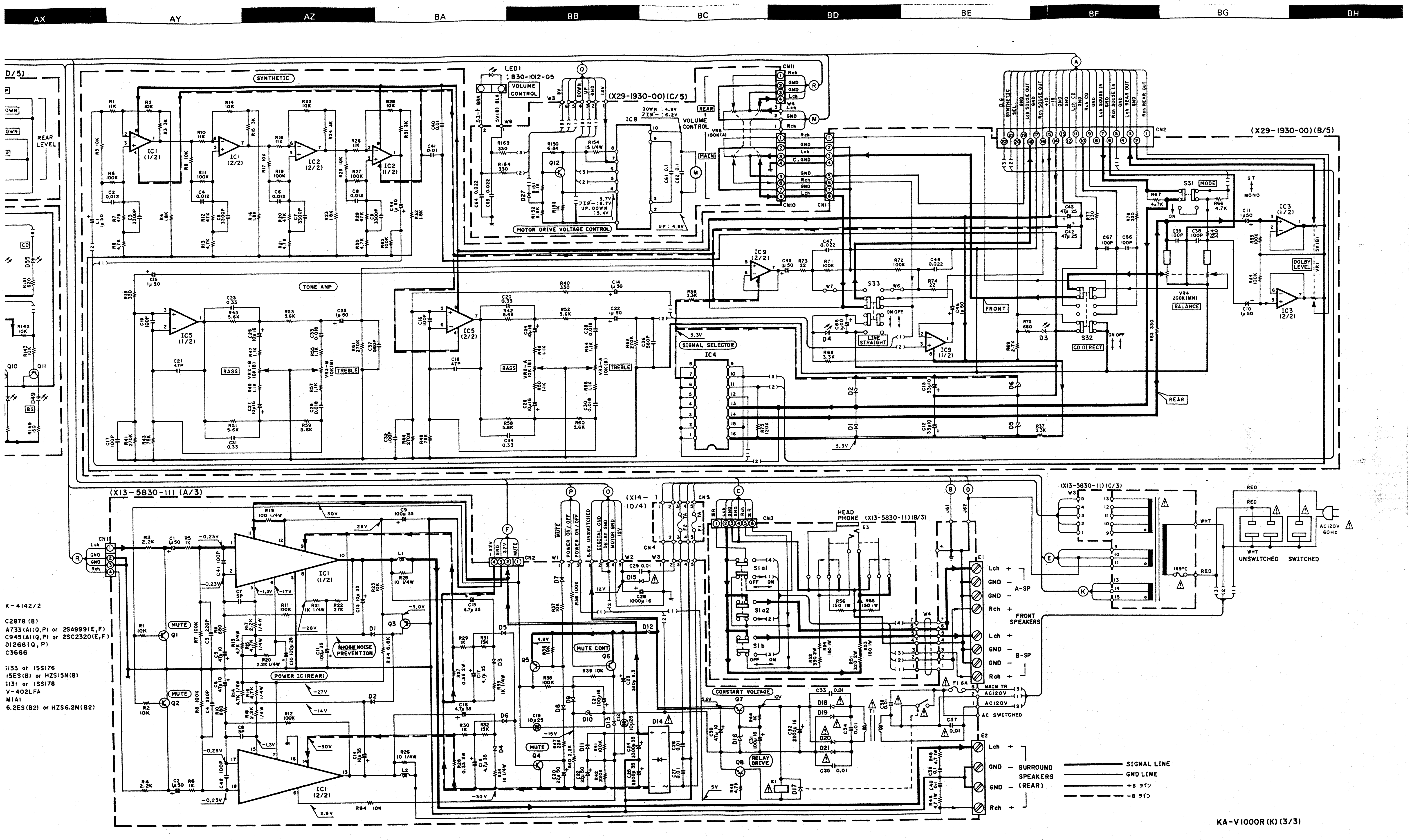
AX
AY
AZ
BA
BB
BC
BD
BE
BF
BG
BH
SYNTHETIC
REAR LEVEL
TONE AMP
BASS
TREBLE
VOLUME CONTROL
B30-1012-05
MOTOR DRIVE VOLTAGE CONTROL
(X29-1930-00)(C/5)
(X29-1930-00)(B/5)
SIGNAL SELECTOR
LINE STRAIGHT
CD DIRECT
FRONT
REAR
MAIN
MODE
ST
MONO
DOLBY LEVEL
BALANCE
(X13-5830-11)(A/3)
(X13-5830-11)(B/3)
(X13-5830-11)(C/3)
POWER IC (REAR)
SHOCK NOISE PREVENTION
MUTE
MUTE CONT
CONSTANT VOLTAGE
RELAY DRIVE
HEAD PHONE
A-SP
FRONT SPEAKERS
B-SP
SURROUND SPEAKERS (REAR)
UNSWITCHED
SWITCHED
AC120V 60Hz
SIGNAL LINE
GND LINE
+B ライン
−B ライン
KA-V1000R(K)(3/3)

K-4142/2

C2878 (B)
A733(A)(Q,P) or 2SA999(E,F)
C945(A)(Q,P) or 2SC2320(E,F)
D1266(Q,P)
C3666

S133 or 1SS176
15ES(B) or HZS15N(B)
S131 or 1SS178
V-402LFA
M1A1
6.2ES(B2) or HZS6.2N(B2)

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Indicates safety critical components. To
:tric shock, leakage-current or resistance

measurements shall be carried out (exposed parts are acceptably insulated from the supply circuit) before the appliance is returned to the customer.

DC voltages are as measured with a high impedance voltmeter with no signal input. Values may vary slightly due to variations between individual instruments or/and units.

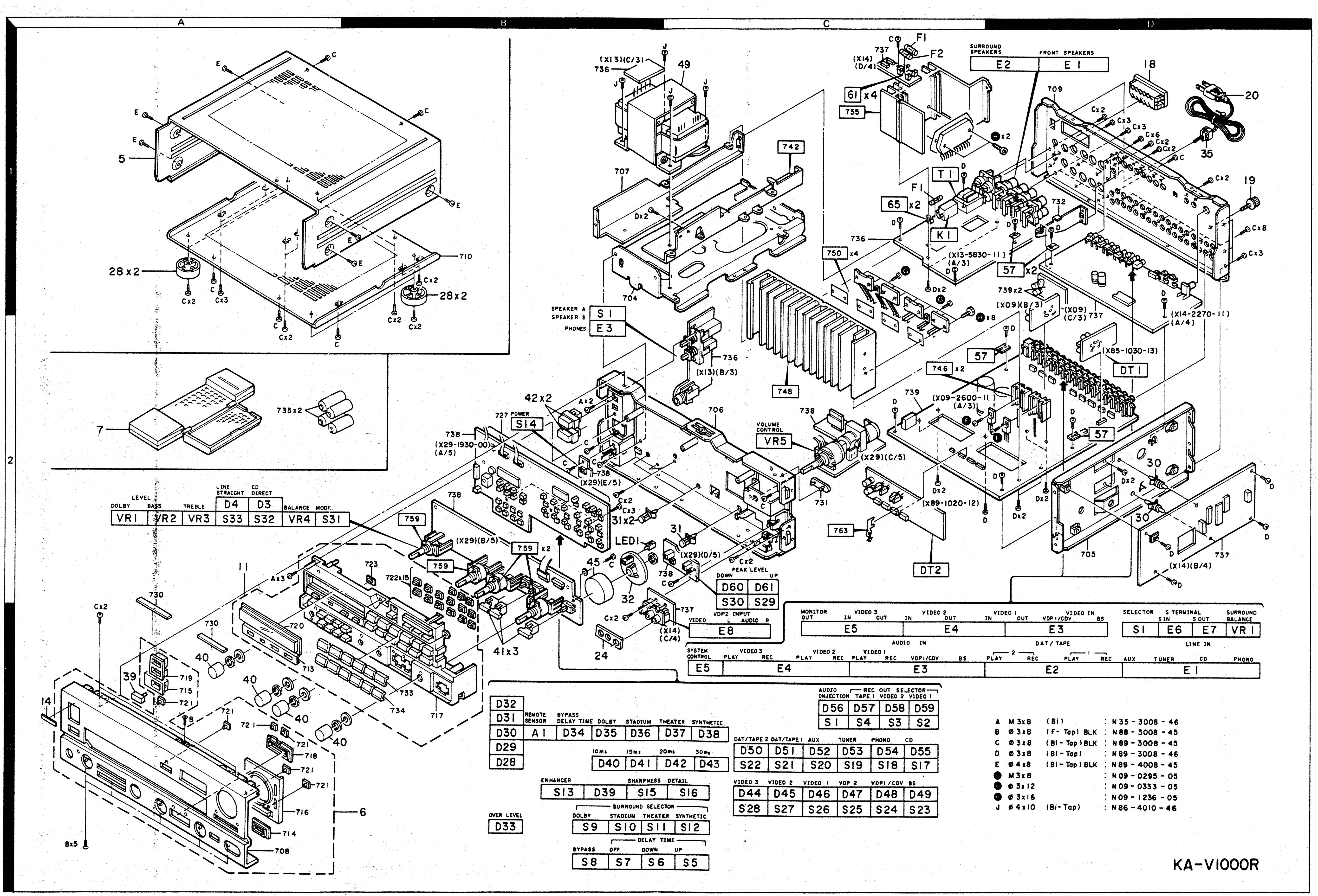
Les tensions c.c. doivent être mesurées avec un voltmètre à haute impédance sans signal d'entrée. Les valeurs peuvent différer légèrement du fait des variations inhérentes aux appareils et aux instruments de mesure individuels.

Die angegebenen Gleichspannungswerte wurden mit einem hochohmigen Spannungsmesser ohne Eingangssignal gemessen. Dabei schwanden die Meßwerte aufgrund von Unterschieden zwischen einzelnen Instrumenten oder Geräten u.U. geringfügig.

KA-V1000R
KENWOOD

KA-V1000R KA-V1000R

EXPLODED VIEW


A
B
C
D
1
2
5
7
735x2
28x2
710
49
736
707
704
742
748
755
61 x4
750 x4
65 x2
T1
K1
57 x2
F1
F2
SURROUND SPEAKERS E2
FRONT SPEAKERS E1
18
20
35
19
709
732
736
737
739x2
(X13)(C/3)
(X14)(D/4)
(X13-5830-11)(A/3)
(X09)(B/3)
(X09)(C/3)
(X14-2270-11)(A/4)
(X85-1030-13)
DT1
746 x2
739
(X09-2600-11)(A/3)
57
SPEAKER A S1
SPEAKER B
PHONES E3
(X13)(B/3)
706
42x2
727 POWER S14
738
(X29-1930-00)(A/5)
(X29)(E/5)
31x2
31
VOLUME CONTROL VR5
(X29)(C/5)
731
763
(X89-1020-12)
DT2
30
705
737
(X14)(B/4)
LEVEL
DOLBY BASS TREBLE
LINE STRAIGHT D4 S33
CD DIRECT D3 S32
BALANCE VR4
MODE S31
VR1 VR2 VR3
759
(X29)(B/5)
759 x2
LED1
45
32
(X29)(D/5)
PEAK LEVEL
DOWN D60 S30
UP D61 S29
737
(X14)(C/4)
VDP2 INPUT VIDEO L AUDIO R E8
24
11
723
722x15
720
713
733
734
717
41x3
730
40
39
719
715
721
718
716
714
708
6
14
Cx2
Bx5
Ax3
MONITOR OUT E5
VIDEO 3 IN OUT E4
VIDEO 2 IN OUT E3
VIDEO 1 IN OUT VDP1/CDV BS
VIDEO IN
SELECTOR S1
S TERMINAL S IN E6 S OUT E7
SURROUND BALANCE VR1
AUDIO IN
SYSTEM CONTROL E5
VIDEO 3 PLAY REC E4
VIDEO 2 PLAY REC
VIDEO 1 PLAY REC VDP1/CDV BS E3
DAT/TAPE 2 PLAY REC 1 PLAY REC E2
LINE IN AUX TUNER CD PHONO E1
D32
D31
D30
D29
D28
REMOTE SENSOR A1
BYPASS D34
DELAY TIME DOLBY D35
STADIUM D36
THEATER D37
SYNTHETIC D38
10ms D40 15ms D41 20ms D42 30ms D43
ENHANCER S13
SHARPNESS D39 S15
DETAIL S16
OVER LEVEL D33
SURROUND SELECTOR
DOLBY S9 STADIUM S10 THEATER S11 SYNTHETIC S12
DELAY TIME
BYPASS S8 OFF S7 DOWN S6 UP S5
AUDIO INJECTION D56 S1
REC OUT SELECTOR TAPE1 D57 S4 VIDEO2 D58 S3 VIDEO1 D59 S2
DAT/TAPE 2 D50 S22
DAT/TAPE 1 D51 S21
AUX D52 S20
TUNER D53 S19
PHONO D54 S18
CD D55 S17
VIDEO 3 D44 S28
VIDEO 2 D45 S27
VIDEO 1 D46 S26
VDP 2 D47 S25
VDP1/CDV D48 S24
BS D49 S23

A	M 3x8	(Bi)	: N35-3008-46
B	Ø 3x8	(F-Tap) BLK	: N88-3008-45
C	Ø 3x8	(Bi-Tap) BLK	: N89-3008-45
D	Ø 3x8	(Bi-Tap)	: N89-3008-46
E	Ø 4x8	(Bi-Tap) BLK	: N89-4008-45
F	M 3x8		: N09-0295-05
G	Ø 3x12		: N09-0333-05
H	Ø 3x16		: N09-1236-05
J	Ø 4x10	(Bi-Tap)	: N86-4010-46

KA-V1000R

Parts with the exploded numbers lager than 700 are not suplied.

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KA-V1000R						
5	1A		A01-1607-01	METALLIC CABINET		
6	3B	*	A20-5402-02	PANEL ASSY		
7	2A	*	A70-0197-05	REMOTE CONTROLLER ASSY		
11	2A	*	B07-1778-02	ESCUTCHEON ASSY		
14	3A		B43-0278-04	KENWOOD BADGE		
-			B46-0092-03	WARRANTY CARD		
-		*	B50-8621-00	INSTRUCTION MANUAL		
-			B58-0269-04	CAUTION CARD		
LED1	2B		B30-1012-05	LED(SLP-981C-50)VOLUME CONTROL		
18	1D		E03-0068-05	AC OUTLET		
19	1D		E21-0006-25	BINDING POST		
20	1D		E30-0978-05	AC POWER CORD		
24	3B		F19-0547-04	BLIND PLATE		
F1	1C		F05-6027-05	FUSE (UL) (250V 6A)X14		
F1 ,2	1C		F05-7026-05	FUSE (UL) (250V 7A)X13		
-			H01-7713-04	ITEM CARTON CASE		
-			H10-3515-02	POLYSTYRENE FOAMED FIXTURE		
-			H10-3516-02	POLYSTYRENE FOAMED FIXTURE		
-		*	H12-2014-04	PACKING FIXTURE		
-			H25-0225-04	PROTECTION BAG (850X450X0.03)		
-			H25-0232-04	PROTECTION BAG (235X350X0.03)		
28	1A,1B		J02-0171-05	FOOT		
30	2D		J19-0586-05	UNIT HOLDER (H=6.7)		
31	2B,2C		J19-2536-05	UNIT HOLDER		
32	3B	*	J19-2895-04	HOLDER (VOLUME CONTROL)		
35	1D		J42-0083-05	POWER CORD BUSHING		
-			J61-0307-05	WIRE BAND		
39	3A		K29-2725-04	KNOB(BUTTON) POWER		
40	3A		K29-2838-04	KNOB(Ø20)LEVEL,BASS,TREB,BAL		
41	3B		K29-2843-04	KNOB ASSY(BUTTON)LINE,CD BAL		
42	2B		K29-2847-04	KNOB ASSY(BUTTON)SPEAKER		
45	2B		K29-2872-03	KNOB(Ø50) VOLUME CONTROL		
49	1C	*	L01-4811-05	POWER TRANSFORMER		
AUDIO UNIT (X09-2600-11)						
C1 -5			CK45FF1H103Z	CERAMIC 0.010UF Z		
C6 ,7			CE04KW1V100M	ELECTRO 10UF 35WV		
C8 ,9			C91-0757-05	CERAMIC 0.001UF K		
C11 ,12			CC45FSL1H221J	CERAMIC 220PF J		
C13 ,14			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C15 ,16			CC45FSL1H221J	CERAMIC 220PF J		
C17 ,18			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C19 ,20			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C21 ,22			CC45FSL1H221J	CERAMIC 220PF J		
C23			CE04KW1C220M	ELECTRO 22UF 16WV		
C24			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C25 ,26			CK45FF1H103Z	CERAMIC 0.010UF Z		
C27 ,28			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C29 ,30			CC45FSL1H221J	CERAMIC 220PF J		
C31 ,32			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		

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C33 ,34			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C35 ,36			CC45FSL1H221J	CERAMIC 220PF J		
C37 ,38			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C39 ,40			CE04KW1V100M	ELECTRO 10UF 35WV		
C51 ,52			CQ09FS1H101JZS	POLYSTY 100PF J		
C53 ,54			CE04KW0J102M	ELECTRO 1000UF 6.3WV		
C55 ,56			CQ09FS1H101JZS	POLYSTY 100PF J		
C57 ,58			C91-0170-05	POLYSTY 22PF K		
C61 ,62			CE04KW1C220M	ELECTRO 22UF 16WV		
C63 ,64			CE04KW1V100M	ELECTRO 10UF 35WV		
C65 -70			CE04KW2A2R2M	ELECTRO 2.2UF 100WV		
C71 -74		*	CE04KW2A4R7M	ELECTRO 4.7UF 100WV		
C75 ,76			CF92FV1H683J	MF 0.068UF J		
C77 ,78			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C79 ,80			CF92FV1H334J	MF 0.33UF J		
C81 ,82			CF92FV1H104J	MF 0.10UF J		
C83 ,84			CE04KW1H2R2M	ELECTRO 2.2UF 50WV		
C85 ,86			C90-1578-05	ELECTRO 10000UF 63WV		
C87 ,88			CK45FE2H103P	CERAMIC 0.010UF P		
C89			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C90 ,91			CE04KW1E470M	ELECTRO 47UF 25WV		
C92 ,93			CE04KW1V100M	ELECTRO 10UF 35WV		
C94 ,95			CK45FF1H223Z	CERAMIC 0.022UF Z		
C96			CE04KW1A101M	ELECTRO 100UF 10WV		
C97			CE04KW1E221M	ELECTRO 220UF 25WV		
C98			CE04KW1E221M	ELECTRO 220UF 25WV		
C99 ,100			CC45FSL1H101J	CERAMIC 100PF J		
C103-106		*	CE04KW2A4R7M	ELECTRO 4.7UF 100WV		
E1	3D		E13-0814-05	PHONO JACK(8P) PHONO;LINE IN		
E2 -4	3C,3D		E13-0820-05	PHONO JACK (DAT/TAPE,VIDEO)		
E5	3C		E11-0165-05	MINIATURE PHONE JACK(SYNCRO)		
L1 ,2			L39-0080-15	PHASE-COMPENSATION COIL		
F	2D		N09-0295-05	HEXAGON HEAD BOLT(M3X8,+)		
G	1C		N09-0333-05	TAPPING SCREW (Ø3X12)		
H	2D		N09-1236-05	TAPPING SCREW (Ø3X16)		
CP1 ,2			R90-0187-05	MULTI-COMP 0.22X2 K 5W		
R105,106			RN14BK2C2150FTS	RN 215.0 F 1/6W		
R107,108			RN14BK2C3832F	RN 38.3K F 1/6W		
R111,112			RS14KB3D100J	FL-PROOF RS 10 J 2W		
R113,114			RD14GB2E330JTS	FL-PROOF RD 33 J 1/4W		
R115,116			RD14GB2E4R7JTS	FL-PROOF RD 4.7 J 1/4W		
R117,118			RS14KB3D100J	FL-PROOF RS 10 J 2W		
R119			RS14KB3D821J	FL-PROOF RS 820 J 2W		
R131,132			RD14GB2E4R7JTS	FL-PROOF RD 4.7 J 1/4W		
R133		*	RS14KB3D822J	FL-PROOF RS 8.2K J 2W		
R134-137			RD14GB2E4R7JTS	FL-PROOF RD 4.7 J 1/4W		
K1			S51-2078-05	MAGNETIC RELAY		
D1 ,2			MC931	DIODE		
D3			1SS133	DIODE		
D3			1SS176	DIODE		
D4 ,5			MC931	DIODE		
D6 ,7			1SS133	DIODE		

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D6 ,7			1SS176	DIODE		
D8 -10			RD4.7ES(B)	ZENER DIODE		
D11			1SS131	DIODE		
D11			1SS178	DIODE		
D12 -15			S3V20	DIODE		
D16			DSM1A1	DIODE		
D17			HZS5.1S(B2)	ZENER DIODE		
D17			RD5.1JS(B2)	ZENER DIODE		
D18			HZS6.8N(B2)	ZENER DIODE		
D18			RD6.8ES(B2)	ZENER DIODE		
D21 -23			1SS133	DIODE		
D21 -23			1SS176	DIODE		
IC1			LC7821	IC(FUNCTION CONTROL SW)		
IC2			LC7822	IC(FUNCTION CONTROL SW)		
IC3			LC7821	IC(FUNCTION CONTROL SW)		
IC4			LC7822	IC(FUNCTION CONTROL SW)		
IC5			LC7823	IC(FUNCTION CONTROL SW)		
IC6			M5218L	IC(OP AMP X2)		
IC7			M5220L	IC(PRE AMPX2)		
IC8			LC4966	IC(CMOS LOGIC BILATERAL SW)		
IC9 ,10			M5218L	IC(OP AMP X2)		
IC11-18			KAZ01	CUSTOM IC		
IC19			M5218L	IC(OP AMP X2)		
Q1 ,2			2SC2878(B)	TRANSISTOR		
Q3 ,4			2SA933S(Q,R)	TRANSISTOR		
Q5 ,6			2SC1740S(Q,R)	TRANSISTOR		
Q7 -10			2SC2878(B)	TRANSISTOR		
Q11 -13			2SA933S(Q,R)	TRANSISTOR		
Q21 ,22			2SC2878(B)	TRANSISTOR		
Q23 ,24			2SC3419	TRANSISTOR		
Q25 ,26			2SC2921*5	TRANSISTOR		
Q27 ,28			2SA1215*5	TRANSISTOR		
Q29			2SD1266(Q,P)	TRANSISTOR		
Q30			2SB941(Q,P)	TRANSISTOR		
Q31			2SC1740S(Q,R)	TRANSISTOR		
Q31			2SC945(A)(Q,P)	TRANSISTOR		
Q32			2SA733(A)(Q,P)	TRANSISTOR		
Q32			2SA933S(Q,R)	TRANSISTOR		
Q33			2SC1740S(Q,R)	TRANSISTOR		
Q33			2SC945(A)(Q,P)	TRANSISTOR		
Q34			2SA733(A)(Q,P)	TRANSISTOR		
Q34			2SA933S(Q,R)	TRANSISTOR		
SUB-CIRCUIT UNIT (X13-5830-11)						
C1 ,2			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C3 ,4			CC45FSL1H221J	CERAMIC 220PF J		
C5 ,6			CE04KW1A470M	ELECTRO 47UF 10WV		
C7 ,8			CC45FSL1H050C	CERAMIC 5.0PF C		
C9			CE04KW1V101M	ELECTRO 100UF 35WV		
C10			CE04KW1E101M	ELECTRO 100UF 25WV		
C11		*	CE04KW1V101M	ELECTRO 100UF 35WV		
C12			C90-1332-05	NP-ELEC 10UF 25WV		
C13 ,14			CE04KW1V100M	ELECTRO 10UF 35WV		
C15 -18			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C19			C90-1332-05	NP-ELEC 10UF 25WV		

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C20			CE04KW1H220M	ELECTRO	22UF	50WV		
C21			CE04KW1C101M	ELECTRO	100UF	16WV		
C22			CE04KW1H220M	ELECTRO	22UF	50WV		
C23			CE04KW0J331M	ELECTRO	330UF	6.3WV		
C24 ,25			C90-0558-05	ELECTRO	3300UF	35WV		
C26 ,27			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C28			CE04KW1C102M	ELECTRO	1000UF	16WV		
C29			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C30			CE04KW1A470M	ELECTRO	47UF	10WV		
⚠ C31			CE04KW1A101M	ELECTRO	100UF	10WV		
C32			CE04KW1C222M	ELECTRO	2200UF	16WV		
C33 -35			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C36 ,37			C91-0647-05	CERAMIC	0.01UF	P		
C39 ,40			CF92FV1H104J	MF	0.10UF	J		
C41 ,42			CC45FSL1H101J	CERAMIC	100PF	J		
57	1D,2D		E23-0149-05	TERMINAL				
E1	1D	*	E20-0825-05	SCREW TERMINAL BOARD(8P)F SP				
E2	1D		E20-0451-05	LOCK TERMINAL BOARD(4P)SURR SP				
E3	2B		E11-0174-05	PHONE JACK				
65	1C		J13-0041-05	FUSE CLIP				
L1 ,2			L39-0085-05	PHASE-COMPENSATION COIL				
T1	1C	*	L01-4951-05	POWER TRANSFORMER				
H	1D		N09-1236-05	TAPPING SCREW (3X16,+ﾛｯｶｸｻﾞ)				
R19			RD14AB2E101J	FL-PROOF RD	100	J 1/4W		
R21			RD14AB2E102J	FL-PROOF RD	1.0K	J 1/4W		
R25 ,26			RD14AB2E100J	FL-PROOF RD	10	J 1/4W		
R27 ,28			RS14DB3DR33J	FL-PROOF RS	0.33	J 2W		
R33 ,34			RD14AB2E102J	FL-PROOF RD	1.0K	J 1/4W		
R45 ,46			RS14DB3A4R7J	FL-PROOF RS	4.7	J 1W		
⚠ R51 ,52			RS14DB3D331J	FL-PROOF RS	330	J 2W		
R53 -56			RS14DB3A151J	FL-PROOF RS	150	J 1W		
K1	1C		S51-1036-05	MAGNETIC RELAY				
S1	2B		S42-2162-05	MULTIPLE PUSH SWITCH(SPEAKER)				
D1 -9			1SS133	DIODE				
D1 -9			1SS176	DIODE				
D10			HZS15N(B)	ZENER DIODE				
D10			RD15ES(B)	ZENER DIODE				
D11			1SS131	DIODE				
D11			1SS178	DIODE				
D12 ,13			1SS133	DIODE				
D12 ,13			1SS176	DIODE				
D14			RBV-402LFA	DIODE				
D15			DSM1A1	DIODE				
D16			HZS6.2N(B2)	ZENER DIODE				
D16			RD6.2ES(B2)	ZENER DIODE				
D17 -21			DSM1A1	DIODE				
IC1			STK-4142/2	IC(AF POWER AMP/ 25WX2)				
Q1 ,2			2SC2878(B)	TRANSISTOR				
Q3			2SA733(A)(Q,P)	TRANSISTOR				
Q3			2SA999(E,F)	TRANSISTOR				
Q4			2SC2320(E,F)	TRANSISTOR				
Q4			2SC945(A)(Q,P)	TRANSISTOR				

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Q5 ,6			2SA733(A)(Q,P)	TRANSISTOR				
Q5 ,6			2SA999(E,F)	TRANSISTOR				
Q7			2SD1266(Q,P)	TRANSISTOR				
Q8			2SC3666	TRANSISTOR				
VIDEO CONTROL UNIT (X14-2270-11)								
C1 -6			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C7			CE04KW1A101M	ELECTRO	100UF	10WV		
C8			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C9			CE04KW1A101M	ELECTRO	100UF	10WV		
C10			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C11 ,12			CE04KW1A470M	ELECTRO	47UF	10WV		
C13			CE04KW1A101M	ELECTRO	100UF	10WV		
C14			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C15 ,16			CE04KW1A470M	ELECTRO	47UF	10WV		
C17			CE04KW1A101M	ELECTRO	100UF	10WV		
C18			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C19 ,20			CE04KW1A470M	ELECTRO	47UF	10WV		
C21			CK45FF1H223Z	CERAMIC	0.022UF	Z		
C22			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C23			CC45FSL1H470J	CERAMIC	47PF	J		
C24 ,25			CE04KW1A470M	ELECTRO	47UF	10WV		
C26			CC45FSL1H560J	CERAMIC	56PF	J		
C27			CC45FSL1H270J	CERAMIC	27PF	J		
C28			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C30			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C31			CK45FB1H102K	CERAMIC	1000PF	K		
C32			CE04KW1H3R3M	ELECTRO	3.3UF	50WV		
C33			CE04KW1A470M	ELECTRO	47UF	10WV		
C34			CE04KW1V4R7M	ELECTRO	4.7UF	35WV		
C35 ,36			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C37			CC45FSL1H270J	CERAMIC	27PF	J		
C38			CC45FSL1H220J	CERAMIC	22PF	J		
C39			CC45FSL1H270J	CERAMIC	27PF	J		
C40			CC45FSL1H220J	CERAMIC	22PF	J		
C41			CE04KW1A101M	ELECTRO	100UF	10WV		
C42			CK45FB1H471K	CERAMIC	470PF	K		
C43 ,44			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C45			CE04KW1V100M	ELECTRO	10UF	35WV		
C46			CE04KW1A101M	ELECTRO	100UF	10WV		
C47			CF92FV1H272J	MF	2700PF	J		
C48			CF92FV1H473J	MF	0.047UF	J		
C49			CF92FV1H103J	MF	0.010UF	J		
C50			CF92FV1H562J	MF	5600PF	J		
C51			CF92FV1H473J	MF	0.047UF	J		
C52			CC45FSL1H221J	CERAMIC	220PF	J		
C53			CF92FV1H153J	MF	0.015UF	J		
C54			CF92FV1H683J	MF	0.068UF	J		
C55			CF92FV1H104J	MF	0.10UF	J		
C56			CE04KW1A101M	ELECTRO	100UF	10WV		
C57			CK45FF1H103Z	CERAMIC	0.010UF	Z		
C58			CE04KW1A470M	ELECTRO	47UF	10WV		
C59 -61			CE04KW1A470M	ELECTRO	47UF	10WV		
C62 ,63			CE04KW1H010M	ELECTRO	1.0UF	50WV		
C64 -66			CE04KW1A101M	ELECTRO	100UF	10WV		
C67 ,68			CE04KW1C102M	ELECTRO	1000UF	16WV		

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C69 -73			CK45FF1H103Z	CERAMIC 0.010UF Z		
C101,102			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C103,104			CC45FSL1H101J	CERAMIC 100PF J		
C105,106			CE04KW1C470M	ELECTRO 47UF 16WV		
C107			CF92FV1H222J	MF 2200PF J		
C109			CF92FV1H153J	MF 0.015UF J		
C111			CC45FSL1H331J	CERAMIC 330PF J		
C113			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C114			CF92FV1H222J	MF 2200PF J		
C116			CF92FV1H153J	MF 0.015UF J		
C118			CC45FSL1H331J	CERAMIC 330PF J		
C120			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C121,122			CC45FSL1H470J	CERAMIC 47PF J		
C123			CF92FV1H272J	MF 2700PF J		
C124,125			CK45FF1H103Z	CERAMIC 0.010UF Z		
C126			CQ09FS1H181J	POLYSTY 180PF J		
C127			CC45FSL1H270J	CERAMIC 27PF J		
C128			CK45FF1H103Z	CERAMIC 0.010UF Z		
C129			CE04KW1A101M	ELECTRO 100UF 10WV		
C130			CE04KW1A470M	ELECTRO 47UF 10WV		
C131			CE04KW1C470M	ELECTRO 47UF 16WV		
C132			CE04KW1A470M	ELECTRO 47UF 10WV		
C133			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C134			CC45FSL1H101J	CERAMIC 100PF J		
C135,136			CE04KW1C470M	ELECTRO 47UF 16WV		
C137-140			CK45FF1H103Z	CERAMIC 0.010UF Z		
C141,142			CE04KW1C470M	ELECTRO 47UF 16WV		
C143			CF92FV1H682J	MF 6800PF J		
C144			CF92FV1H183J	MF 0.018UF J		
C145			CF92FV1H102J	MF 1000PF J		
C146			CE04KW1C101M	ELECTRO 100UF 16WV		
C147			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C148			CF92FV1H273J	MF 0.027UF J		
C149			CF92FV1H472J	MF 4700PF J		
C150			CE04KW1C101M	ELECTRO 100UF 16WV		
C151			CE04KW1HR33M	ELECTRO 0.33UF 50WV		
C152			CE04KW1H0R1M	ELECTRO 0.1UF 50WV		
C153			CF92FV1H103J	MF 0.010UF J		
C154			CF92FV1H473J	MF 0.047UF J		
C155			CK45FB1H471K	CERAMIC 470PF K		
C156			CF92FV1H562J	MF 5600PF J		
C157-160			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C161			CE04KW1C101M	ELECTRO 100UF 16WV		
C162-164			CK45FF1H103Z	CERAMIC 0.010UF Z		
C165,166			CE04KW1V4R7M	ELECTRO 4.7UF 35WV		
C167			CE04KW1C101M	ELECTRO 100UF 16WV		
C168			CE04KW1V100M	ELECTRO 10UF 35WV		
C169			CK45FF1H103Z	CERAMIC 0.010UF Z		
C170			CE04KW1A470M	ELECTRO 47UF 10WV		
C171			CK45FB1H102K	CERAMIC 1000PF K		
57	1D		E23-0149-05	TERMINAL		
E3 -5	3C,3D		E13-0305-05	PHONO JACK (VIDEO,MONITOR)		
E6 ,7	3D		E06-0521-05	CYLINDRICAL RECEPTACLE		
E8	3C	*	E13-0312-05	PHONO JACK (VDP2 INPUT)		

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61	1C		J13-0041-05	FUSE CLIP		
L1			L40-1501-17	SMALL FIXED INDUCTOR(15UH,K)		
L2			L40-4711-46	SMALL FIXED INDUCTOR(470UH,K)		
L3			L40-2211-46	SMALL FIXED INDUCTOR(220UH,K)		
L4 ,5			L40-1501-17	SMALL FIXED INDUCTOR(15UH,K)		
L6 ,7			L79-0756-05	LC FILTER		
X1			L77-1131-05	CRYSTAL RESONATOR		
X2			L78-0226-05	RESONATOR		
R194			RD14GB2E271J	FL-PROOF RD 270 J 1/4W		
R198			RD14GB2E221J	FL-PROOF RD 220 J 1/4W		
R199			RD14GB2E181J	FL-PROOF RD 180 J 1/4W		
R201			RD14GB2E271J	FL-PROOF RD 270 J 1/4W		
R202			RD14GB2E121J	FL-PROOF RD 120 J 1/4W		
VR1	3D		R05-5012-05	POTENTIOMETER(100K)SURR BAL		
VR2			R12-5060-05	TRIMMING POT.(200K)		
VR3 ,4			R12-1089-05	TRIMMING POT.(4.7K)OFFSET		
VR5			R12-3126-05	TRIMMING POT.(10K)VOLUME CONT		
S1	3D		S31-2095-05	SLIDE SWITCH (SELECTOR)		
D1 -27			1SS133	DIODE		
D1 -27			1SS176	DIODE		
D28			HZS3.3N(B2)	ZENER DIODE		
D28			RD3.3ES(B2)	ZENER DIODE		
D29 -32			DSM1A1	DIODE		
D33			1SS133	DIODE		
D33			1SS176	DIODE		
D34 ,35		*	HZS6.8N(B3)	ZENER DIODE		
D34 ,35		*	RD6.8E(B3)	ZENER DIODE		
D36 -45			1SS133	DIODE		
D36 -45			1SS176	DIODE		
D51			HZS6.2N(B)	ZENER DIODE		
D51			RD6.2ES(B)	ZENER DIODE		
D52			HZS11N(B)	ZENER DIODE		
D52			RD11ES(B)	ZENER DIODE		
D53			HZS6.2N(B)	ZENER DIODE		
D53			RD6.2ES(B)	ZENER DIODE		
D54 -59			1SS133	DIODE		
D54 -59			1SS176	DIODE		
D61 -64			HZS3.3N(B)	ZENER DIODE		
D61 -64			RD3.3ES(B)	ZENER DIODE		
IC1 -3			TC4051BP	IC(8CH MPX/ DE-MPX)		
IC4			MB88305	IC(I/O EXPANDER)		
IC5			NJM2220S	IC(VIDEO SIGNAL)		
IC6		*	MB88323A-K2	IC(DISPLAY CONTROLLER)		
IC7			LA7820	IC(DEFLECTION FOR COLOR TV)		
IC8 -10			M5218P-A	IC(OP AMP X2)		
IC11			TC4053BP	IC(3-INPUT 2CH MPX/DE-MPX)		
IC12			TL810CP	IC(HIGH SPEED COMPARATOR)		
IC13			PCM54HP	IC(DA CONVERTER)		
IC14			UPD65012CW-220	IC(MICROPROCESSOR)		
IC15			PCM56P	IC(DA CONVERTER)		
IC16			TMM2115BP-15	IC(2KX8 RAM)		
IC17			M5218P-A	IC(OP AMP X2)		
IC18			NE645N	IC(DOLBY B PROCESSOR)		

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IC19			M5218P-A	IC(OP AMP X2)		
IC20			TC4052BP	IC(4CH MPX/DE-MPX)		
IC21,22			M5218L	IC(OP AMP X2)		
IC23			LC7535	IC(VOLUME,BALANCE,LOUDNESS)		
Q1			2SA733(A)(Q,P)	TRANSISTOR		
Q1			2SA999(E,F)	TRANSISTOR		
Q2 -11			2SC2320(E,F)	TRANSISTOR		
Q2 -11			2SC945(A)(Q,P)	TRANSISTOR		
Q12			2SA733(A)(Q,P)	TRANSISTOR		
Q12			2SA999(E,F)	TRANSISTOR		
Q13 -15			2SC2320(E,F)	TRANSISTOR		
Q13 -15			2SC945(A)(Q,P)	TRANSISTOR		
Q16 -21			2SK105(F,H)	FET		
Q22			2SA733(A)(Q,P)	TRANSISTOR		
Q22			2SA999(E,F)	TRANSISTOR		
Q23 -27			2SC2320(E,F)	TRANSISTOR		
Q23 -27			2SC945(A)(Q,P)	TRANSISTOR		
Q28 ,29			2SC2003(L,K)	TRANSISTOR		
Q30			2SC2320(E,F)	TRANSISTOR		
Q30			2SC945(A)(Q,P)	TRANSISTOR		
Q31			2SA733(A)(Q,P)	TRANSISTOR		
Q31			2SA999(E,F)	TRANSISTOR		
Q32 ,33			2SA954(L,K)	TRANSISTOR		
Q51			2SK105(F,H)	FET		
Q52 ,53			2SC2320(E,F)	TRANSISTOR		
Q52 ,53			2SC945(A)(Q,P)	TRANSISTOR		
Q54 ,55			2SC1845(F,E)	TRANSISTOR		
Q56			2SA733(A)(Q,P)	TRANSISTOR		
Q56			2SA999(E,F)	TRANSISTOR		
Q57			2SC2320(E,F)	TRANSISTOR		
Q57			2SC945(A)(Q,P)	TRANSISTOR		
CONTROL CIRCUIT UNIT (X29-1930-00)						
D3 ,4	2A		B30-1012-05	LED(SLP-981C-50)LINE,CD		
D28 -32	3B		B30-1010-05	LED(SLP-281F-50U)REMOTE SENSOR		
D33 -43	3B,3C		B30-1012-05	LED(SLP-981C-50)DOL,STUDIUM		
D44 -49	3C		B30-1010-05	LED(SLP-281F-50U)VIDEO,VDP		
D50 -61	3C,2C		B30-1012-05	LED(SLP-981C-50)DAT,TUNER,CD		
C1			CE04JW1H010M	ELECTRO 1.0UF 50WV		
C2			CF92FV1H123J	MF 0.012UF J		
C3			CF92FV1H332J	MF 3300PF J		
C4			CF92FV1H123J	MF 0.012UF J		
C5			CF92FV1H332J	MF 3300PF J		
C6			CF92FV1H123J	MF 0.012UF J		
C7			CF92FV1H332J	MF 3300PF J		
C8			CF92FV1H123J	MF 0.012UF J		
C9			CF92FV1H332J	MF 3300PF J		
C10 ,11			CE04JW1H010M	ELECTRO 1.0UF 50WV		
C12 ,13		*	CE04JW1A330M	ELECTRO 33UF 10WV		
C14 ,15			CE04JW1H010M	ELECTRO 1.0UF 50WV		
C16 ,17			CC45FSL1H101J	CERAMIC 100PF J		
C18			CC45FSL1H470J	CERAMIC 47PF J		
C19			CC45FSL1H101J	CERAMIC 100PF J		
C20			CF92FV1H334J	MF 0.33UF J		
C21			CC45FSL1H470J	CERAMIC 47PF J		

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C22			CE04JW1H010M	ELECTRO 1.0UF 50WV		
C23			CF92FV1H334J	MF 0.33UF J		
C24 -27			CE04JW1C100M	ELECTRO 10UF 16WV		
C28 -30			CF92FV1H183J	MF 0.018UF J		
C31			CF92FV1H334J	MF 0.33UF J		
C32			CC45FSL1H101J	CERAMIC 100PF J		
C33			CF92FV1H183J	MF 0.018UF J		
C34			CF92FV1H334J	MF 0.33UF J		
C35			CE04JW1H010M	ELECTRO 1.0UF 50WV		
C36 ,37			CK45FB1H561K	CERAMIC 560PF K		
C38 ,39			CC45FSL1H101J	CERAMIC 100PF J		
C40 ,41			CK45FF1H103Z	CERAMIC 0.010UF Z		
C42 ,43			CE04KW1E470M	ELECTRO 47UF 25WV		
C44 -46			CE04JW1H010M	ELECTRO 1.0UF 50WV		
C47 ,48			CF92FV1H223J	MF 0.022UF J		
C50			CE04KW0J471M	ELECTRO 470UF 6.3WV		
C51			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C52			C91-0937-05	BACKUP 0.047F 5.5WV		
C53			CE04KW0J471M	ELECTRO 470UF 6.3WV		
C54			CE04KW1H0R1M	ELECTRO 0.1UF 50WV		
C55 -58			CK45FB1H561K	CERAMIC 560PF K		
C59			CK45FF1H223Z	CERAMIC 0.022UF Z		
C60			C91-0085-05	CERAMIC 0.022UF N		
C61 ,62			C91-0700-05	CERAMIC 0.1UF J		
C63			CK45FF1H103Z	CERAMIC 0.010UF Z		
C64 ,65			CK45FF1H223Z	CERAMIC 0.022UF Z		
C66 ,67			CC45FSL1H101J	CERAMIC 100PF J		
C68			CE04JW1H010M	ELECTRO 1.0UF 50WV		
X1			L78-0209-05	RESONATOR (4.194MHZ)		
R154			RD14GB2E150J	FL-PROOF RD 15 J 1/4W		
VR1	2A	*	R06-2019-05	POTENTIOMETER(5KB)DOLBY LEVEL		
VR2 ,3	2A		R06-3056-05	POTENTIOMETER(10KB)BASS,TREB		
VR4	2A		R06-5167-05	POTENTIOMETER(200KMN)BALANCE		
VR5	2C	*	R29-5014-05	POTENTIOMETER(100KA)VOL CONT		
S1 -30	3B,3C		S40-1064-05	PUSH SWITCH (POWER,AVDIO ENJ)		
S31	2A		S40-2351-05	PUSH SWITCH (MODE)		
S32 ,33	2A		S40-4074-05	PUSH SWITCH (LINE STR,CD DIR)		
D1 ,2			1SS133	DIODE		
D1 ,2			1SS176	DIODE		
D5 ,6			HZS8.2N(B2)	ZENER DIODE		
D5 ,6			RD8.2ES(B2)	ZENER DIODE		
D10			HZS11N(B)	ZENER DIODE		
D10			RD11ES(B)	ZENER DIODE		
D11 -16			1SS133	DIODE		
D11 -16			1SS176	DIODE		
D17			HZS4.7N(B)	ZENER DIODE		
D17			RD4.7ES(B)	ZENER DIODE		
D18 -27			1SS133	DIODE		
D18 -27			1SS176	DIODE		
D62			1SS133	DIODE		
D62			1SS176	DIODE		
IC1 -3			M5218P-A	IC(OP AMP X2)		
IC4			TC4053BP	IC(3-INPUT 2CH MPX/DE-MPX)		

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IC5			UPC4570C	IC(OP AMP X2)		
IC6		*	UPD75106CW-076	IC(MICROPROCESSOR)		
IC7			MB88304-P	IC(I/O EXPANDER)		
IC8			BA6229	IC(MOTOR DRIVER)		
IC9			UPC4570C	IC(OP AMP X2)		
Q1 ,2			2SC1740S(Q,R)	TRANSISTOR		
Q1 ,2			2SC945(A)(Q,P)	TRANSISTOR		
Q3			2SA954(L,K)	TRANSISTOR		
Q4			2SA1286	TRANSISTOR		
Q5			2SC1740S(Q,R)	TRANSISTOR		
Q5			2SC945(A)(Q,P)	TRANSISTOR		
Q6 -11			2SA733(A)(Q,P)	TRANSISTOR		
Q6 -11			2SA999(E,F)	TRANSISTOR		
Q12			2SC1740S(Q,R)	TRANSISTOR		
Q12			2SC945(A)(Q,P)	TRANSISTOR		
A1	3B		W02-0776-05	ELECTRIC CIRCUIT MODULE		
PREAMPLIFIER UNIT (X85-1030-13)						
C1 ,2			CE04FW1C100M	ELECTRO 10UF 16WV		
C3 ,4			CE04KW0J331M	ELECTRO 330UF 6.3WV		
C5			CF92FV1H123J	MF 0.012UF J		
C6			CF92FV1H123J	MF 0.012UF J		
C7			CF92FV1H332J	MF 3300PF J		
C8			CF92FV1H332J	MF 3300PF J		
C9 ,10			CE04KW1V100M	ELECTRO 10UF 35WV		
C11 ,12			CK45FF1H103Z	CERAMIC 0.010UF Z		
C15 ,16			CK45FB1H561K	CERAMIC 560PF K		
IC1			UPC4570C	IC(OP AMP X2)		
MAIN AMPLIFIER UNIT (X89-1020-12)						
C1 ,2			CE04KW1H010M	ELECTRO 1.0UF 50WV		
C7 ,8			CF92FV1H822J	MF 8200PF J		
C9 ,10			CC45FSL1H330J	CERAMIC 33PF J		
C11 ,12			CC45FSL1H181J	CERAMIC 180PF J		
C13 ,14			CC45FSL1H220J	CERAMIC 22PF J		
C15 ,16			CK45FB1H561K	CERAMIC 560PF K		
C17 ,18		*	CE04KW2A2R2M	ELECTRO 2.2UF 100WV		
C19 ,20			CK45FF1H103Z	CERAMIC 0.010UF Z		
C23			C90-1333-05	NP-ELEC 22UF 10WV		
C24			CE04KW1C220M	ELECTRO 22UF 16WV		
C26			CE04KW1C330M	ELECTRO 33UF 16WV		
C27 ,28			CC45FSL1H101J	CERAMIC 100PF J		
C29 ,30			CE04KW1C220M	ELECTRO 22UF 16WV		
R19			RD14GB2E122JTS	FL-PROOF RD 1.2K J 1/4W		
R20 -22			RD14AB2E122JTS	FL-PROOF RD 1.2K J 1/4W		
R23			RD14GB2E181JTS	FL-PROOF RD 180 J 1/4W		
R24			RD14AB2E181JTS	FL-PROOF RD 180 J 1/4W		
R29 -32			RD14AB2E331JTS	FL-PROOF RD 330 J 1/4W		
R39 -42			RD14AB2E220JTS	FL-PROOF RD 22 J 1/4W		
R43 -46			RD14AB2E221JTS	FL-PROOF RD 220 J 1/4W		
R47 -50			RD14AB2E2R2JTS	FL-PROOF RD 2.2 J 1/4W		
R51 ,52			RD14AB2E100JTS	FL-PROOF RD 10 J 1/4W		
R61 -63			RD14AB2E101JTS	FL-PROOF RD 100 J 1/4W		
R64			RD14GB2E101JTS	FL-PROOF RD 100 J 1/4W		
VR1 ,2			R12-1070-05	TRIMMING POT.(1K)BIAS ADJ		

E: Scandinavia & Europe K: USA P: Canada
U: PX(Far East, Hawaii) T: England M: Other Areas
UE : AAFES(Europe) X: Australia

⚠ indicates safety critical components.

PARTS LIST

※ New Parts
Parts without Parts No. are not supplied.
Les articles non mentionnes dans le Parts No. ne sont pas fournis.
Telle ohne Parts No. werden nicht geliefert.

※ 新規部品
(注)部品番号がないものは修理用部品として扱いません。

Ref. No. 参照番号	Address 位置	New Parts 新	Parts No. 部品番号	Description 部品名／規格	Desti-nation 仕向	Re-marks 備考
D1 ,2			HZS5.1S(B2)	ZENER DIODE		
D1 ,2			RD5.1JS(B2)	ZENER DIODE		
D3 ,4			1SS133	DIODE		
D3 ,4			1SS176	DIODE		
D5 -8			1SS131	DIODE		
D5 -8			1SS178	DIODE		
IC1			UPC1237HA	IC(POWER AMP)		
Q1 -4			2SC1845(F,E)	TRANSISTOR		
Q5 -8			2SC2320(E,F)	TRANSISTOR		
Q5 -8			2SC945(A)(Q,P)	TRANSISTOR		
Q9 -12			2SC1845(F,E)	TRANSISTOR		
Q13 -18			2SA992(F,E)	TRANSISTOR		
Q19 ,20			2SC1845(F,E)	TRANSISTOR		
Q21 ,22			2SC3944(Q,R)	TRANSISTOR		
Q23 ,24			2SA1535(Q,R)	TRANSISTOR		
Q25 ,26			2SC2631(R,S)	TRANSISTOR		
Q27 ,28			2SA1123(R,S)	TRANSISTOR		
Q29			2SA992(F,E)	TRANSISTOR		

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KA-V1000R

SPECIFICATIONS

<Audio Section: Front>

Power Output

80 watts per channel minimum RMS, both channels driven at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.02% total harmonic distortion.

Dynamic power..............130 W per channel at 8 ohms
185 W per channel at 4 ohms
Total harmonic distortion
LINE input to speaker output
(20 Hz to 20,000 Hz)...0.02% at 80 W into 8 ohms
(1 kHz).......................0.002% at 80 W into 8 ohms
Intermodulation distortion
(60 Hz:7 kHz=4:1).......0.02% at 80 W into 8 ohms)
Power band width...........5 Hz to 45 kHz at 0.06% T.H.D. into 8 ohms
Frequency response.........5 Hz to 100 kHz/+0 dB, −3 dB
PHONO
(RIAA standard curve)...20 Hz to 20 kHz/±0.3 dB
Input sensitivity/impedance
PHONO (MM)...............2.5 mV 47 kohms
Except PHONO............150 mV 47 kohms
Signal to nois ratio (IHF-A)
PHONO (MM)...............77 dB (2.5 mV)
Except PHONO............100 dB (150 mV)
Output level/impedance
TAPE REC (pin).............150 mV 2.2 kohms
Phono maximum input level
(PHONO to REC OUT).....145 mV (RMS) T.H.D. 0.02% at 1 kHz
Tone control
BASS (at 100 Hz)..........±10 dB
TREBLE (at 10 kHz).......±10 dB

Kenwood follows a policy of continuous advancements in development.
For this reason specifications may be changed without notice.
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Noise reduction circuit made under licence from Dolby Laboratories Licensing Corporation.

Note:
Component and circuitry are subject to modification to insure best operation under differing local conditions. This manual is based on, the U.S.(K) standard, and provides information on regional circuit modification through use of alternate schematic diagrams, and information on regional component variations through use of parts list.

<Audio Section: Rear>

20 watts per channel minimum RMS, both channels driven at 8 ohms from 20 Hz to 20,000 Hz with no more than 0.2% total harmonic distortion.

<Video Section>

Input sensitivity/
impedance...................1 Vp-p at 75 ohms
Output level/impedance
REC OUT.....................1 Vp-p at 75 ohms
Frequency Response
(Monitor out)...............5 Hz to 6 MHz/+0 dB, −3 dB
Signal to noise ratio
(Monitor out)...............65 dB

<General>

Power consumption.........6 A
Dimensions...................W: 440 mm (17-5/16")
H: 159 mm (6-1/4")
D: 425 mm (16-3/4")
Weight (Net)..................13.7 kg (30.14 lb)

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